The Chemical Age

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Notes and Comments

A Critical Month

FOR some years past the month of August has witnessed the beginnings of political and economic crises. Last August is fresh in the mind of all our readers. The Government toppling, the bank rate 6 per cent., gold flowing out of the Bank of England, unemployment mounting, trade dwindling, everybody in a condition of nervous tension. It is by glancing back in this way that we can get a better valuation of the present position. A good many of our troubles remain with us. The cures have yet to be accomplished. But the fever, the excitement, the uncertainty have all abated, and we do know where we are, and the Government, whatever may be our political views, is recognised to be stable. The credit position has been immensely improved by the success of the conversion operation. The Budget is going to balance. There is no longer any doubt about that. We still have to tackle the great question of economy, but by sacrifices on the part of taxpayers, ratepayers and investors the balance is no longer in question. In a word, we have our feet on the ground, and that is a position which promotes confidence. Signs are not wanting of the effect of returning confidence. There is an upward tendency in those wholesale prices which had sunk so low as to bring disaster to producers. Putting all these things together no-one can doubt that the situation is immeasurably healthier than it was a year ago, and as that view becomes clearer and stronger we may look for a continuous revival in trade.

Entering the Road to Recovery

AUGUST 1, 1932, may well stand out in history as the date on which the road to recovery was entered. The major part of the great conversion operation having been successfully accomplished, nothing now stands in the way of the final accomplishment of the task taken up by the National Government nearly a year ago. It has balanced the British Budget, virtually disposed of reparations at Lausanne, and firmly established British credit on a $3\frac{1}{2}$ per cent. basis. Its mandate, however, included a clear call to national economy, and it is at last free to bend all its energies to that end. A beginning was made with retrenchment in Government expenditure last autumn, but it has hardly been followed up with the energy which might have been expected after the decisive voting at the general election. Yet it is the undoubted key to future prosperity. Without further drastic cuts in both national and municipal expenditure there can be no relief from the taxing and rating burdens which weigh with increasing heaviness upon industry and commerce. The competitive power of Great Britain in the markets of the world can never be restored until these burdens have been brought down to the irreducible minimum. The nation has long been ahead of the Government on the subject of economy, and public opinion is once more being aroused to the urgent necessity of a drastic policy. What the Government entrusted with other people's money does not recognise with the same clarity as private citizens spending their own is that real economy spells in the long run true efficiency. No business which permits of the slightest element of waste can prosper permanently, and a much closer watch on the expenditure of every Government Department and on every municipal authority is essential if the full benefit is to be reaped from the Government's undoubted successes in other parts of the financial field.

Holidays with Pay

A LIST of industries in which there are either general or district agreements for granting holidays with pay has been prepared by the Ministry of Labour. It is estimated that approximately 1,500,000 workers are covered by these agreements, and in addition large numbers of salaried clerks and shop assistants and other salaried employees are regularly granted holidays with pay, as well as many workers on "standing" wages and wage earners employed by certain individual firms which are not parties to collective agreements arranged by employers' associations and trade unions. There are general agreements covering 22 industries or occupations. The list includes the heavy chemical industry, drug and fine chemical manufacture, wallpaper manufacture, cement manufacture, the cocoa and chocolate and fruit preserving trades, printing, bookbinding, etc. (except newspapers, London), the traffic grades and certain other classes employed by the railway companies, tramway undertakings, gas undertakings, the industrial staffs of Government departments and the non-trading services (in certain districts) of local authorities. The district agreements include the omnibus services in a number of areas, including London, local authority public utility services, electricity supply undertakings, workpeople employed in newspaper printing offices in London, in baking in a number of places, and the employees of co-operative societies over a very wide area. Moreover, provision for holiday payments is recognised by some employers' associations, although not

embodied in agreements with the workpeople's organisations. It has been recommended, for example, by the Wholesale Clothing Manufacturers' Federation and the Shirt, Collar, and Tie Manufacturers' Association and by others.

Payment to time-workers is generally made at the full weekly time rate of wages and in some cases payment is made to piece-workers on the same basis. In the paint, colour and varnish trades the pieceworkers' holiday pay is based on their average weekly earnings during the month preceding the holiday. Many of the agreements provide that the holidays for which payment is made shall be a certain number of consecutive days, and in many cases it is also provided that the holiday period shall fall between definite dates in the summer months. A few agreements require a contribution, in one form or another, towards the payment for holidays. In the boot and shoe industry equal contributions to the holiday fund are made by employers and workpeople, the amount being 1s. 2d. a week in respect of adult men, with smaller amounts for other classes of workpeople.

Training for Commerce

THERE are two sides to the chemical industry—the technical side, which is fairly adequately catered for by some fourteen or more professional organisations, and the commercial side, which, in every way, is just as important as the technical, for the industry, like any other, lives only on what it sells—either in goods or service—to the community. The technical side, no matter how perfectly it may be trained and organised, would soon cease to exist if the commercial side did not function, and for that reason we attach considerable importance to any movement for the improvement of the salesman. The conference habit may not achieve so much as some people claim, but it goes a long way, and mention must be made of the International Congress on Commercial Education, held in London last week and attended by representatives of no fewer than 35 different countries. Sir David Milne Watson, governor of The Gas Light and Coke Company, was the president of the Congress, and the final meeting on July 29 was addressed by the Prince of Wales, than whom the Empire has no greater salesman.

His Royal Highness, who pointed out that the urgent task for the world was to bring about the adjustments necessary to bring consumption and production into proper relationship, said the study and organisation of distribution was the particular business of those engaged in commerce, and the growing importance of the problems of distribution made more urgent and important than ever the skilful and scientific conduct of commerce. He had said enough to his fellow-countrymen on past occasions as to the need for high efficiency in commerce in a " nation of shopkeepers " for it to be unnecessary to do more on the present occasion than refer to that point in passing on to its corollary—namely, that a need for high efficiency in commerce entailed the provision of sound, adequate, carefully planned education for commerce, not only before employment but subsequently during employment. Much attention had been paid to this subject in this country during the past two or three years. Growing attention was being paid to it throughout these islands by educationists, by parents and by employers, the three essential partners who must work together if education and commerce were to co-operate successfully to the desired end. He was particularly glad to see the universities so strongly represented among the supporters of the Congress, for it was of great importance that they should, each in their own way, take into account the fact that an increasing number of graduates were making—and he hoped still more would make—commerce their profession, and were seeking to fit themselves thoroughly for leadership in business. He begged those at the head of commercial undertakings in this and in every other country not to forget the value to business of trained intelligence and of training for leadership.

More Efficient Salesmanship

THE chemical industry, equally with all the other great industries of this country, is, as we have pointed out, dependent upon first class salesmanship for its ultimate success, and is indebted to the Prince of Wales for again calling attention to the great need for proper commercial training His Royal Highness's speech at the final meeting of the International Congress on Commercial Education last week was not the first he had delivered this year on the same subject. A little time ago, at the twenty-first annual meeting of the Incorporated Sales Managers' Association, attended by a number of representatives of chemical interests, he stressed the urgent need for more efficiency marketing methods. He pleaded for the closest consultation and co-operation between all those engaged in planning, directing, supervising and operating our industry and commerce; between all grades of employees in all trades. Industrial harmony is needed as a basis for commercial prosperity—not a harmony making for contented somnolence, but directed to increasing the driving force and efficiency in every trade. " We want everyone engaged in business," he said, " to be on his toes to make that business a success, to feel as keen for his side to win in business as he is for his team to win in sport." His Royal Highness said he was afraid that many employers were inclined to underrate the importance, the positive commercial value, of education for commerce, even when—and that was not always—they recognised the value of technical education in the sense of education for industry.

The Government Committee on Education for Salesmanship, over which Sir Francis Goodenough presided, laid stress in its report on the importance of employers paying close attention to the recruitment of their commercial staffs, and in this connection the Prince of Wales pointed out that there had been a revolution in our educational system since the beginning of the century, to which employers were not in all cases fully alive. There are four secondary pupils available for employment to-day for every one available 25 years ago. Allied closely to the question of selection is that of pay and prospects, as to which the Prince remarked in his address that employers are adjured by the committee to offer such prospects, in the near as well as more distant future, as will attract the very best types of recruit for their purpose. He endorsed the dictum of the committee that employers could not hope to get a first-class article at a third-class rate.

The Jet Condenser in Industry

By F. JOHNSTONE TAYLOR

This article deals with the features of modern barometric condensers for vacuum pans, ammonia compressors, evaporators, acid concentrators, rotary driers and related types of chemical plant.

So far as condensing steam from engines and turbines is concerned, the jet condenser is not necessarily an inferior piece of equipment to the surface type. When conditions are suited to it (as they often are in industrial steam plants) it is a good piece of equipment, simple and cheap to install and reliable in operation. Usually it takes the form of a barometric condenser which is essentially a different piece of apparatus from the low level jet condenser as associated with power plant.

The principle of all jet condensers is the simple one of spraying cold water directly on the steam. One pound of steam at atmospheric pressure has 1,642 times the bulk of the water from which it is evaporated. In consequence, on condensation it will be reduced to 1/1642 of its former size and if the process occurs in an air tight vessel, a vacuum will naturally result. On account of the air present in both the steam and water, however, the vacuum will only be maintained if this air is removed, while the degree of vacuum depends upon the temperature and the amount of the cooling water and the ability of the condenser to maintain a steam temperature as nearly equal as possible to the temperature of the outlet water. Theoretically, the colder the water used, or the greater the amount used, the lower will be the discharge temperature and the better the vacuum, provided the condenser will bring the steam temperature down close to the outlet water temperature, while effective air removal calls for cooling of the air to as low a temperature as possible, that is the temperature of the injection water. This reduction in temperature is essential to condense out the vapour associated with the air and to concentrate that which remains.

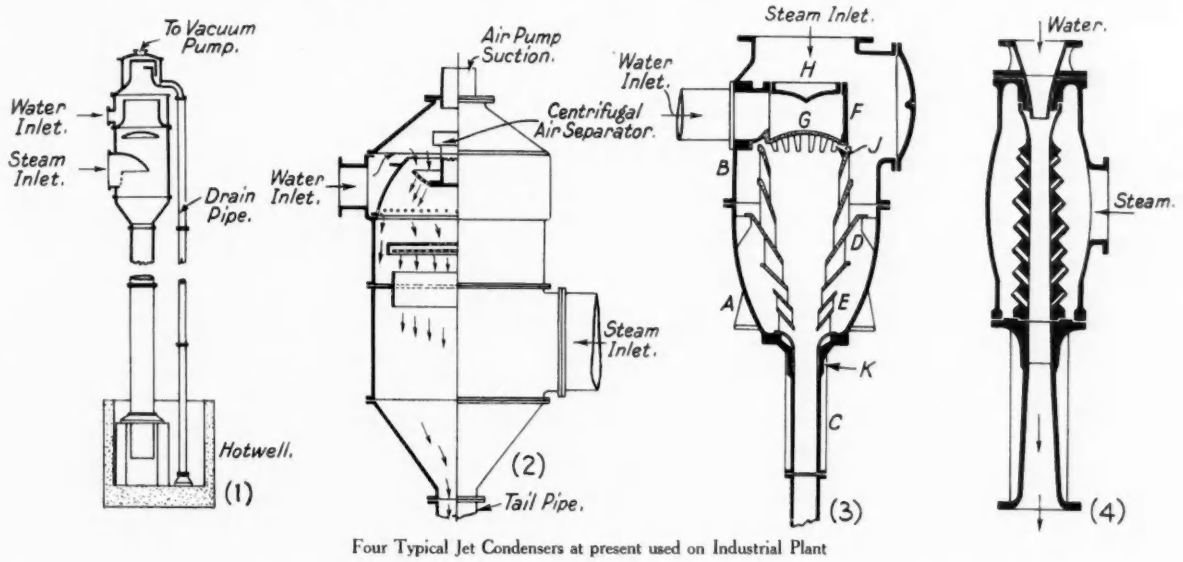
Features of Construction

The principle of condensing steam by direct contact with water could be carried out in more or less crude equipment, but for efficient operation the water must be heated to a temperature close to that of the incoming steam and the air and residual vapours cooled to the incoming water temperature. One of the most effective means of doing this is to make use of the counter-current principle. Fig. 1 shows how the counter-current principle is made use of in the Ingersoll Rand barometric condenser. Here the water enters a pool in the condensing chamber at a point above the steam entry, ample opportunity being given for the air content of the water to be removed by the vacuum pump at a point above the level of this pool. In this way the air that enters the condenser with the water is removed at the temperature of the latter as it enters. The exhaust steam is led into the centre of the condensing chamber by means of the steam inlet nozzle and the curved internal hood. The steam is thus completely surrounded by a falling sheet of water and since the entire volume of the injection water is in contact with the steam immediately on entry complete condensation ought to take place. The air released from the steam when the latter is condensed in the base of the condenser is at a relatively high temperature and contains a large amount of water vapour. This mixture of air and water ascends through the descending cold water and is thereby effectively cooled and devapourised before it reaches the vacuum pump. By having the air as dense and dry as possible the work on the air pump is reduced to the minimum and the least amount of water will be required for a given duty. In other words it is an efficient piece of apparatus, which anything of a crude or makeshift nature will obviously not be.

Fig. 2 shows another arrangement due to the Worthington Co., which incorporates the counter-current principle. This condenser can be used, if necessary, with a short length of tail pipe as a centrifugal jet condenser, though the more general one is that having the customary 34 feet or so of tail pipe. It is intended primarily for use with a dry vacuum pump and it provides for the cooling of the air before removal. There are no interior bolting or moving parts; the water sprays are eccentric to the body and they provide a large steam space directly at the exhaust inlet which gradually reduces in area as the steam is condensed. This reduces risk of loss of vacuum due to the velocity of the steam. It is also claimed that it is free from any tendency of reversal of current as the critical temperature is reached, which is a known defect of counter-current condensers having a solid spool or cascade.

Multi-jet Condensers

The multi-jet condenser (Fig. 3) works on a somewhat different principle. Here the head (B) and the body (A) form a closed cylindrical chamber, in the upper end of which is a water nozzle case (F) containing the nozzle plate (G), the water nozzles (J) and a nozzle case cover (H). Below the nozzle case is a combining tube (D) and the combining tube extension (E) consisting of sets of tapering rings joined together by equally spaced ribs. The condenser head is provided with top and side inlets, either of which may be used for connection to the vapour pipe, the one not used being closed with a flanged cover. The nozzles are so designed and arranged to discharge the specified volume



Four Typical Jet Condensers at present used on Industrial Plant

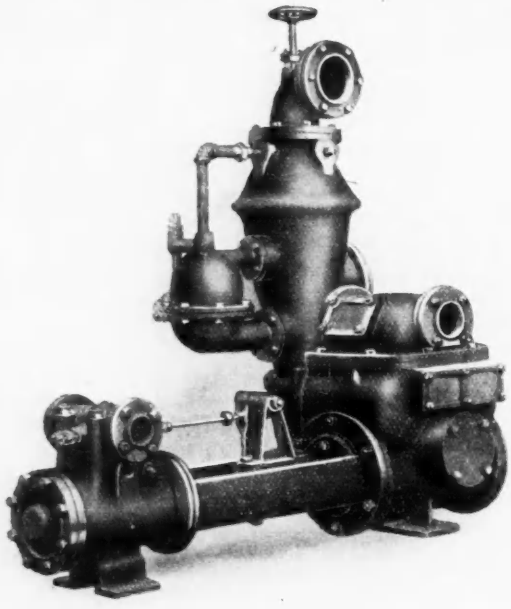


Fig. 5.—A Horizontal Wet Vacuum Pump with an Adjustable Spray Cone Condenser

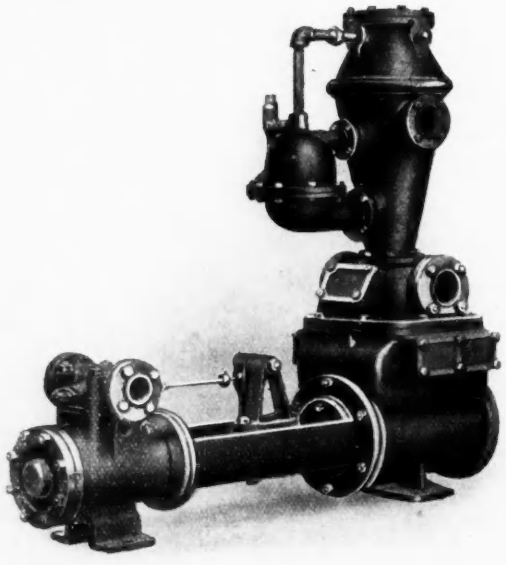


Fig. 6.—Single Horizontal Air Pump with Spray Pipe Jet Condenser

of water at zero pressure and the required vacuum. The water jets are directed through the combining tube and its extension into the throat (K) of the tail piece (C). Here they unite and form a single jet. The vapours enter the condenser chamber through the top (or side) vapour inlet, they flow through the annular passes of the combining tube and then come into direct contact with the converging water jets and are so condensed. The tapering rings of the combining tube and its extension are designed to give a uniform steam velocity at all points. The pressure difference between the nozzle case and the condenser vacuum space causes flow through the nozzles and this head assisted by gravity produces water jets of sufficient velocity to entrain the condensed steam, the air and the non-condensible gases and to discharge them into the barometric discharge columns connected to the bottom of the tail piece. The condenser is started with the injection water at slight positive pressure, but as the vacuum builds up, the injection is gradually throttled.

So far as other arrangements embodying the same general principle are concerned, there arise instances in which the vapour or exhaust steam connections on vacuum apparatus are located at an appreciable distance above ground. Then, in order to eliminate a long costly exhaust line, the condenser can be raised to the level of the vacuum apparatus and provided with a long tail pipe leading into a hot well at ground level. The condenser elevation is sufficient to ensure positive discharge through the tail pipe without necessitating a high jet velocity of the water issuing from the condenser nozzles. The water may be supplied at a pressure just sufficient to cause flow through the nozzles. The vacuum created by the entraining effect of the water jets assists the flow of water into the condenser and in many instances it can lift the injection water an appreciable distance after vacuum has been established with injection pressure slightly above zero. The air entrainment is sufficient to give high vacuum performance on evaporators, vacuum pans and apparatus of a similar nature.

The Eductor Principle

The essential feature of the eductor, or as it is sometimes termed, the ejector condenser, is the elimination of the air pump. As shown in Fig. 4 the water enters through the tapered nozzle at the top while the steam enters the condenser body through the side inlet, flowing through a series of inclined ports in a long cylindrical combining tube. Therein it is brought into direct contact with the injection water and condensed. The ports are arranged to give a steam flow in a direction parallel to that of the water jet. The total area through these ports is greater than the area of the steam side which in turn corresponds to the size of the exhaust pipe. The injection water is delivered at about 20 feet head and this pressure, combined with the internal vacuum, produces a water velocity at the outlet of the nozzle of something like 50 ft. per second. This velocity gives the water jet sufficient energy to discharge through the narrow throat and the Venturi tail piece into the hot well against atmospheric pressure. In passing through the combining tube, the water jet entrains the steam, condenses it and discharges the condensate together with all the air and non-condensible gases. It is this entrainment feature which eliminates the air pump and so simplifies and cheapens the apparatus, the only auxiliary power consuming equipment required being a simple form of centrifugal pump.

Operating Without a Pump

As the water enters the condenser under pressure, the injection pump can be placed close to the cold water supply and by being so designed to operate with a relatively low suction lift, a standard design can be worked at high efficiency. Moreover, if water is available from a factory service main, an overhead tank or elevated cooling system located at sufficient height to produce the necessary injection pressure at the condenser inlet, it can be worked without any pump. Usually condensers of this type are installed in a vertical position and they discharge through a short tail extension into a hot well immediately underneath or close by. If it is necessary to place it in an elevated position the discharge pipe can be lengthened, which incidentally reduces the injection pressure necessary. At 35 ft. this is practically nil and the condenser becomes virtually a barometric one, though it can still operate without a vacuum pump. If the water has to be led through a vertical discharge leg, an eductor condenser can be operated with excess pressure to allow of this and it can be worked in an inclined or even horizontal position, if necessary.

THE Deutsche Gold und Silber Anstalt, the principal German manufacturers of cyanogen fumigants, has developed a new ingenious method for the storage and shipment of fumigants for certain outlets. The cyanogen compounds are mixed with solidified carbon dioxide and shaped into cubes or tablets. As an added precaution, warning agents are incorporated in the mixture inasmuch as the cyanogen compounds used are odourless.

Refractory Cements

Principal Features and Methods of Testing

The following extracts are taken from an article which appears in "Chemical and Metallurgical Engineering," where Mr. W. R. Kerr discusses the types, uses and testing of the refractory cements which are used for bonding and coating firebrick walls.

REFRACTORY cements of the present time are of many different compostions. There are a large number of brands on the market which are designed to fit various refractory applications and are recommended for use all the way from a dull red heat up to temperatures in excess of 3,000° F. Basically, however, most cements are similar in that they contain clay and grog. A certain quantity of raw plastic clay or kaolin adds plasticity and renders the cement workable. In addition to the raw clay, the cement usually contains a variable quantity of grog (crushed brick, refractory mineral aggregate, ground saggers, etc.). This grog component, in most cases, is the refractory substance in the cement, and apart from building up the refractoriness of the body, it is of material benefit because it reduces the drying and firing shrinkage. The basic formula of clay plus grog may be modified in several ways to produce suitable mortars for laying and coating certain types of firebrick. By using a highly siliceous grog such as ganister, a cement may be made adaptable to silica brick. Ground chromite used as grog produces a chrome-base cement which is desirable for certain conditions in furnaces. Then again, certain fluxes, such as felspar, ground glass, mica, and so on, may be added to the clay-grog body in order to lower the fusing point and cause the cement to form a semi-glaze on the surface to which it has been applied.

Air-Setting Cements

All of the combinations mentioned above may be further modified by the addition of a cold bonding agent which, upon drying, will set or harden so as to act as a binder for the mass. Such binders are commonly liquid sodium silicate, dry sodium silicate powder, dextrine, molasses, or some other substance which sets upon drying. These binders may be added to the cement in wet form and sold ready mixed, as is the case with many cements. The alternative manner of adding the binder is to make a dry mixture of the bond and cement; it is then only necessary to mix the dry cement with water on the job. Air-setting cements have been developed on account of the need for a strong joint in the brickwork. Certain heavy structures require a stronger bond than is produced by fireclay alone, and the cold-setting cements have filled this need. In the case of organic binders, such as dextrine, the original strength obtained when the cement sets is lost when the cement is fired, and the bond must then be developed by the action of heat. The inorganic binders, of which sodium silicate is by far the most common, do not lose their strength to such a great extent upon moderate heating, but aid in the development of the bond as the cement is heated during firing of the brickwork.

The grade of sodium silicate used in refractory cements is quite important. While most of the liquid grades produce a firm cold bond, the behaviour of the various grades under heat are quite different. A grade having a ratio of soda to silica of 1 : 2.4 has been found to be satisfactory. If a grade which contains more silica is used, the strength decreases more rapidly with a rise in temperature, while if a more alkaline silicate is used, the fusion point of the cement is lowered by too great an amount and the air-setting properties of the material are retarded.

High Temperature Bonds

Refractory cements which depend on the action of heat for the development of a bond are used where a cold-set bond is not necessary. Such cements are useful in providing a cushioned joint which allows some expansion and contraction where the bond is not set up hard by the action of heat. This class of cement usually includes the more refractory types, which are recommended for extremely high temperatures (above 3,000° F.), since the absence of fluxing agents prevents lowering the melting point and permits the cement to be used at high temperature. Many compositions are offered by the manufacturers to fill the needs for different types of cements. For silica brick, a cement usually is recommended which has a silica base. Chrome-base cements are useful where a chemically neutral condition is desirable. The clay-grog mixtures are used quite commonly in laying up firebrick, in almost all types of furnaces where moderately severe conditions are encountered. During the past few years there have appeared on the market a number of so-called super-refractory cements which contain more refractory substances as a base. Some of these are chromite, calcined diaspore, mullite grain, silicon carbide, alumina and sillimanite.

Grain size of the grog particles in the cement affects the workability of the cement. The finer the grind, the better is the workability, although the shrinkage is somewhat increased by excessive reduction of the fines. In three satisfactory ready-mixed cements recently examined, all the grog passed a 28-mesh (0.00232-in.) sieve and approximately 50 per cent. of it passed a 200-mesh sieve (0.0029-in.). This shows the extent to which the fineness of grog can be extended and still give a satisfactory product. Most cements will pass a 20-mesh sieve.

Practical Application

The most successful application to which any given cement can be put are best determined by its characteristics. Some of the more common uses are as a bond in setting brick, in wash-coating or spraying a protective facing over finished walls and as a patching mixture for eroded or spalled brickwork. Air-setting cements are commonly used to repair broken saggers or special refractory shapes such as kiln-car tops. Shapes can frequently be repaired a number of times, greatly prolonging the life of the equipment and markedly decreasing the maintenance cost. In setting firebrick, the usual methods employ either a buttered joint tapped in place with a hammer, or a dipped joint which is rubbed in place. The dipped joint usually is preferred because, as pointed out by Harvey, the dipped surface makes better contact with the cement than does a surface on which a coating of cement has been trowelled. This method is well adapted for laying up brickwork with very thin joints. It is more rapid than other methods and hence a saving in labour is effected. Dipped joints should be laid by dipping the brick into a batter of the cement which has been thinned with water to a cream or soup consistency, and then rubbing or tapping the brick into place.

Protective coatings of refractory cement are of value on new brickwork. The coating can be applied either by brush or spray. In any case it is best to apply it with cement which has been thinned to a creamy consistency. For a brush coating the brickwork should be blown free of dust, after which the cement is brushed on with a stiff brush or broom, working it into the pores. An equally effective coating can be applied by spraying with a cement gun. This latter method is rapid, and even coatings can be applied. A home-made gun is suitable for most cements, but special pieces of apparatus are available for more rapid handling of the mixture. Protective facings are of value where there is a tendency to clinkering, provided the cement is refractory enough. A properly applied facing offers some protection against erosion by high-velocity gases and tends to retard disintegration of the refractory by action of furnace gases. It also tends to render the brickwork gas-tight. Whenever coatings are applied, they should be as thin as is consistent with the protection offered, since thick coatings frequently have a tendency to chip and peel away from the wall.

Desirable Properties of Cements

When refractory cements are to be selected for any of these applications, there are several general specifications which should be regarded in making a choice. The cement should be of such a chemical nature that it will not react with the refractory at elevated temperatures. It should be inert chemically to the action of furnace gases and be resistant to slag attack. Drying and firing shrinkage should be low; excessive firing shrinkage causes the cement to peel from

the wall. It should have a refractoriness at least equal to the brick with which it is used. The coefficient of expansion of the dried cement should be low or, rather, it should be practically the same as that of the wall to which it is to be applied; differential expansion causes cracking and peeling with ultimate failure.

If an air-setting cement is used, it should set firm within a few hours; if the cement has a tendency to creep and set slowly, the brickwork may settle when additions are built upon it.

Some of the more important of the desirable properties of a cement are refractoriness, freedom from cracking, low shrinkage, and service under load at definite temperatures. The refractoriness is easily found by the standard method for determination of p.c.e. (pyrometric cone equivalent). Wet cements should first be calcined. Cracking and shrinkage can be observed by brushing or trowelling layers of cement of various thicknesses on brick, and after allowing them to dry, heating to a definite temperature. Another method long favoured by one company that tests cements frequently is to trowel on the face of a brick. The wedge usually tapers from zero at one end of the brick to about $\frac{1}{4}$ in. at the other. Upon drying and firing the sample, it is possible to gain an idea of the approximate thickness which can be applied safely in practice before cracking or excessive shrinkage appears.

The behaviour of the cement with a certain grade of refractory, under definite conditions of loading and temperature, is easily determined by constructing a suitable pier of half brick bonded with the cement to be tested. These piers are conveniently made in sandwich form, bonding either three or four half bricks with cement, using joints approximately $\frac{1}{4}$ in. thick. The pier, when dry, is set in a suitable testing furnace and loaded to a predetermined figure. The temperature is then raised to simulate a service condition and after an interval of time the pier is allowed to cool and is examined. This test reveals any tendency for the cement to react with the refractory under pressure and also the resistance of the cement to load at the temperature used.

Bulgaria and the Crisis

Position of the Chemical and Allied Trades

THE British Consul at Sofia, in his report on "Economic Conditions in Bulgaria," published for the Department of Overseas Trade by H.M. Stationery Office (2s. 6d. net), indicates that the nature of the crisis in the economic conditions in the country during 1931 and up to the end of April of the present year has necessitated greater emphasis being placed on financial matters, including such questions as foreign exchange restrictions and public finance, than would normally be the case in a report on any individual country. At the same time, his report also covers the trade conditions.

The Bulgarian Government has clearly indicated its determination to maintain the official rate of exchange at parity, and to preserve the gold reserves of the National Bank. The methods which it has adopted for this purpose are summarised in the report. Although conditions in the country are strained, Bulgaria has an asset to safeguard her against the possibility of complete economic collapse. She is first and foremost a nation of peasant proprietors able to live to a great extent on the products of their labours, and her future prosperity must be built up on this foundation. Local industry does exist and has received considerable legislative assistance, but it is not anticipated that it will ever play a rôle other than that of subordinate to agriculture. With the recovery of prices for agricultural produce, Bulgaria should be in a position to pay for her reasonable import requirements, although the potentialities of the market are limited, and in dealing with the country, neither excessive optimism nor unwarranted pessimism should influence transactions.

Shrinkage in Value of Trade

The report states that in spite of the general economic depression the banking position, taken as a whole, is believed to be strong. More solvent conditions prevailed during 1931 than previously, as many of the weaker firms had by then been eliminated. Favourable signs are, however, still few. Stocks are at a low level and prices equally low. Foreign firms, when willing to trade under existing circumstances, rendered so difficult by exchange transactions, are limiting their activities. No considerable change has been made in the trend of the supplying countries during the last few years, nor has any marked difference occurred in the character of the imports, except for a tendency to substitute raw and semi-manufactured products for the finished article. As elsewhere, there has been an acute shrinkage of the value of trade during the past year. The report includes the usual chapters containing an examination of the main features of the economic life of Bulgaria, including an appreciation, of the agricultural position, and the legislative efforts made for its improvement, a brief summary of the various industrial enterprises, as well as a note of their encouragement. It is accompanied by annexes dealing specifically with the conditions prevailing in the Varna and Bourgas districts.

Imports of copper sulphate in 1931 amounted to 2,781 tons as against 1,704 in 1930. Owing to inability of United Kingdom manufacturers to supply the full needs of the market, 1,378 tons were bought in Hungary. Great Britain supplied 1,295 tons. The supremacy of United Kingdom manufacturers in this commodity will be re-established in 1932. In 1931 Great Britain supplied 424 tons of palm and coconut oil for industrial use out of a total import of 1,605 tons. This compares favourably with 1930, when she supplied 163 tons out of a total import of 1,342 tons.

Trend of United Kingdom Trade

The trend of United Kingdom trade with Bulgaria is indicated in a series of tables from which the following items are extracted:—

BULGARIAN IMPORTS FROM THE UNITED KINGDOM.

	Values in millions of leva.*			
	1928	1929	1930	1931
Metals and metallurgical products ..	56·2	70·8	71·4	281·8
Chemicals and products	54·8	45·8	31·0	24·2
Vegetable oils, fats, wax and products	21·8	18·4	12·2	16·9
Rubber and products	9·5	9·8	8·8	5·0
Tanning and dyeing materials, paints and varnishes	4·1	4·7	3·3	7·9
Tars, resins, mineral oils and adhesives	0·9	2·7	0·8	4·1
Stone, earth, glass and products ..	1·0	1·1	0·4	0·5

* At par £1=673·66 leva. Current rates £1=480 to 520 leva.

During 1930, 117 concerns in the chemical industry were of sufficient consequence to receive industrial privileges, of which 89 were companies and 28 unipersonal firms. The total capital invested was 397,827,420 leva, workpeople employed numbered on an average 2,031, and wages paid totalled 46,659,172 leva. Production was valued at 352,865,539 leva for internal consumption and at 100,235,170 leva for export. The principal trades, graded according to output were:—Soap-making, rubber products, explosives and matches, paints, chemical products including acids and salts.

Referring to non-ferrous metals, the report states that 27,448 tons of copper, 9,737 tons of galena and 2,762 tons of zinc blende ores were extracted during 1930, mostly at mines of the "Plakalnitza" Company (French) in the N.W. Balkan and Bourgas areas. During 1931 this company mined about 900 tons, which comprises the total ore production in Bulgaria for that year, and all mining operations are now suspended on account of the world crisis.

Norwegian Demand for Earth Pigments

MINERAL earth pigments are not found in Norway and, therefore, imports represent domestic consumption of the products. Demand for ochre, umber, sienna and iron oxides in recent years has been approximately 1,500 tons a year. While separate import statistics covering the group are not available, estimates place 95 per cent. of the ochre coming from France and the balance of a darker colour coming from Germany.

The Institution of Chemical Engineers' Examinations

This Years' Associate-Membership Papers

THE examinations for Associate-Membership of the Institution of Chemical Engineers were held on July 7 and 8 and were preceded by the usual home papers earlier in the year. As on previous occasions, the candidates were entertained to dinner at the Chemical Club, after which a *viva voce* session was held. Appended are copies of this year's examination papers.

Home Paper—Section A.

1. Prepare a detailed scheme for the manufacture of sodium sulphide from sodium sulphate suitable for an output of 10 tons per day of 24 hours. Submit detailed flow sheets showing balances of materials, heat and other forms of energy, and time. Calculate, as far as possible from first principles, the main dimensions of all essential parts of the installation. Give an approximate estimate of the capital outlay, and of the cost of production. Prepare a general arrangement drawing of the entire plant and a working drawing, technical specification and detailed cost estimate for one of the following:—(a) One of the furnaces you would employ, or (b) the plant to be used for the extraction of the soluble materials from the furnace mass.

2. Assuming that the necessary electrical energy is available in a convenient supply, prepare a detailed scheme for the manufacture by electrolysis of three tons per day of 24 hours of either (a) potassium perchlorate, or (b) ammonium persulphate. Submit detailed flow sheets showing balances of materials, heat and other forms of energy, and time. Calculate, as far as possible from first principles, the main dimensions of all essential parts of the installation. Give an approximate estimate of the capital outlay, and of the cost of production. Indicate what special instruments you would employ in order satisfactorily to control the operation of the electrolytic cells, and prepare a general arrangement drawing of the whole plant; also a working drawing, technical specification and detailed cost estimate for one of the cells you would propose to use.

3. Prepare a detailed scheme for the manufacture of meta-nitro-aniline from meta-dinitrobenzene by reduction with sodium polysulphide suitable for an output of two tons per day of 24 hours. Reasonable assumptions may be made covering thermo-chemical data not obtainable from reference books. Indicate what saleable by-product could be obtained and how you would isolate this in a pure and marketable condition. Submit detailed flow-sheets showing balances of materials, heat and other forms of energy, and time. Calculate, as far as possible from first principles, the main dimensions of all essential parts of the installation. Give an approximate estimate of the capital outlay, and of the cost of production. Prepare a general arrangement drawing of the whole plant, and a working drawing, technical specification and detailed cost estimate for one of the reducing vessels employed.

4. Prepare a detailed scheme for the manufacture of five tons per day of 24 hours of carbon tetrachloride from carbon bi-sulphide, assuming a supply of chlorine gas at atmospheric pressure to be available. Submit detailed flow-sheets showing balances of materials, heat and other forms of energy, and time. Calculate, as far as possible from first principles, the main dimensions of all essential parts of the installation. Give an approximate estimate of the capital outlay, and of the cost of production. Prepare a general arrangement drawing of the whole plant, showing clearly any special precautions you would take in handling the various materials, and give a working drawing, technical specification and detailed cost estimate for the purification plant you would employ.

Section B.

5. Calculate the heat loss by radiation and by convection from a 100 ft. length of horizontal steam main, 4 in. diameter, carrying saturated steam at a pressure of 500 lb. per sq. in. on the assumption that the pipe is unlagged. Calculate the loss for the same pipe covered with a 2 in. thickness of lagging, having a co-efficient of conductivity of 1×10^{-4} c.g.s. units. Derive theoretical formulæ expressing the variation in heat loss with changes in thickness of lagging and changes in the thermal conductivity of the lagging material. In all cases the external surface of the pipe or lagging may be considered to have been painted with aluminium paint.

6. Discuss "The principle of dynamic similarity," with special reference to its bearing on heat transfer and fluid flow problems in chemical engineering. Give examples of the practical application of this principle in the co-ordination of experimental data and in the solution of practical problems.

7. Calculate theoretically the power consumption of a vacuum pump of the pressure equalisation type. Prepare diagrams showing the variation in power consumption with variation in pressure on the suction side. Discuss the influence of pressure equalisation on power consumption, and indicate the effect of variation of end clearance volume on the power consumption.

8. Write an essay on modern investigations into the mechanical properties of mild steel, with special reference to the effects of temperature, alternating stresses and stress concentration.

Section C—Part I.

1. Calculate approximately the essential dimensions of an air heater to raise 5,000 cu. ft. per minute from 15° to 150° C. by combustion of fuel oil of calorific value 19,000 B.Th.U. per lb. It is to be assumed that the air does not come into contact with the products of combustion. Give the necessary data from which a draughtsman could make drawings.

2. Describe what equipment you would install for the preparation of a solution containing 0.02 per cent. of sodium carbonate at the rate of one million gal. per day of 8 hours.

3. Heat is transferred from a hot to a cold liquid through a dividing plate, *e.g.*, a tube wall, which is ¼ in. in thickness. Discuss the effect on the overall heat transfer of using plates of the undermentioned materials for the two cases:—(a) Where the velocity of both liquids over the plate surface is 8 ft. per second and the heat transfer coefficient from the hot liquid to the wall is 10,000 kg. cals./sq. m./hr./° C. and from the plate to the cold liquor 5,000 kg. cals./sq. m./hr./°C. (b) Where the velocity of both liquids is 2 ft. per second, other conditions remaining as before.

Materials.

	Thermal conductivity in c.g.s. units.
Aluminium	0·492
Lead	0·082
Copper	0·908
Glass	0·0018

Turbulent flow is assumed in both cases.

4. A coal of the composition given below is burnt in a furnace and it is found experimentally that the percentage of undeveloped heat (due to CO in the waste gases) is related to the percentage of excess air as follows:—

= excess) air	10	20	30	40	50	60	70	80
% undeveloped heat	7·6	3·75	2·4	2·0	1·25	0·8	0·7	0·6

Assuming that the waste gases leave the system at 400° C., calculate the optimum percentage of excess air.

Composition of Coal.

	Per cent.
C.	69·65
H.	4·65
N.	1·50
S.	2·10
O.	9·55
Ash	12·55

Calorific value, 12,500 B.T.U. per lb.

The molecular sensible heats at 400° C. of the constituents of the waste gases may be taken as :—

CO_2 and SO_2	..	6970 B.T.U. per lb. mol. above	15° C.
O_2 and N_2 ..	..	4710 ,, ,, ,,	15° C.
H_2O	..	4525 ,, ,, ,,	100° C.

For the purposes of this calculation, the small percentage of CO in the gases may be neglected.

5. Describe, with the aid of roughly dimensioned sketches, a coke-fired furnace suitable for producing 12,000 cu. ft. per minute of flue gases at a temperature of 300° C. for use in a drying tunnel. Give the approximate fuel consumption, based on coke having a net calorific value of 13,200 B.Th.U. per lb.

Section C—Part II.

6. The heat transferred from a liquid flowing through a tube of circular cross-section to the tube surface has been expressed by the equation :—

$$h = 23.2 \frac{k}{D}\left(\frac{Dv\rho}{z}\right)^{0.8}$$

where :—

h is the film coefficient expressed in B.Th.U. per sq. ft./hr./° F.

D = internal diameter of the tube in inches.

v = mean velocity of the liquid flowing in ft./sec.

p = density of liquid expressed as lb./cu. ft.

z = specific viscosity of the liquid (z = 1 for water at 68° F.).

k = thermal conductivity of the liquid in B.Th.U./sq. ft./ft. thickness/hr./° F.

Convert the formula into c.g.s. units, expressing :—

h as gramme calories/sq. cm./sec./° C.

D in cm.

k in gramme calories/sq. cm./cm./sec./° C.

p in grammes per cu. cm.

Coefficient of absolute viscosity (η) in c.g.s. units (η for water at 68° F. = 0.01).

7. Give a description of the essential parts of an installation for the pneumatic transport of a granular salt. Discuss theoretically the factors which limit the energy efficiency of installations of this type.

8. Air flows through a given length of pipe, 5 cm. internal diameter, at a velocity of 5,000 cm. per second. The drop in pressure due to frictional resistance over the length is found to be 1 lb. per sq. in. If water is passed through the pipe at a velocity of 394 cm. per second, what is the drop in pressure? The following data may be used :—

	Air.	Water.
Density (ρ)	0·001225	1·0
Kinematic viscosity (ν)	0·145	0·01143

9. A rectangular tank 3 ft. × 3 ft. × 9 ft. in height is full of water. A horizontal pipe of 1 in. int. diameter and 100 ft. in length is connected to the bottom of the tank. The loss in head due to friction in passing through the pipe may be assumed as $h = 0.45V^2$, where h is the head in ft. of water, and V is the velocity of flow in ft. per second. Neglecting any loss at the pipe inlet, calculate the time necessary to lower the level of the water from 9 ft. to 2 ft. when emptying through the pipe.

10. A circular wooden vat, 15 ft. in height and 12 ft. in diameter, is constructed of staves held by wrought iron hoops. Determine the sectional area and number of the hoops required. Make a rough sketch showing the method you would employ for tightening the hoops, and calculate the tensile stress in each hoop when the vat is full of water

Section D—Part I.

1. Aqueous alcohol, containing 10 per cent. of alcohol by weight, is concentrated to 90 per cent. in a continuous rectifying column, with a reflux ratio of 3 to 1. The feed has a temperature of 15° C. The effluent is free from alcohol. Calculate the heat requirements of the column per 100 kg. of feed. Calculate also what amount of heat you would expect to be saved by using the condenser and the hot effluent to preheat the feed. Radiation losses may be neglected.

Specific heat of 10% alcohol	= 0·97
Latent heat of 90% alcohol	= 247 Kg. Cals./kg.
Boiling-point of 10% alcohol	= 91·3° C.
Boiling-point of 90% alcohol	= 78·9° C.

2. It is required to concentrate a tanning extract liquor at the rate of half a ton per hour from 10 per cent. to 45 per cent. solids in solution, the liquor entering at 15° C. Calculate the approximate amount of steam at 30 lb. per sq. in. gauge pressure required for :—(a) Working in single effect under a vacuum of 26½ in. of mercury, and (b) working in single effect without vacuum. State what materials of construction you would use, and what type of condensing plant you would employ, giving reasons for your choice. Determine the quantity of cooling water required if initially at 15° C.

3. An ammonia compression refrigerating plant has the following theoretical outputs per indicated horse-power at different evaporator temperatures, other conditions remaining constant.

Evaporator temp. ° C.		Cals. output/hr./ I.H.P.
—20	..	3,950
—15	..	4,810
—10	..	6,000
— 5	..	7,800
— 0		10,810

It is desired to install a cooler in which 100,000 kg. cals./hr. are to be removed at a constant temperature of +5° C. from a liquid. The capital cost of a cooler is £30 per sq. m. of cooling surface. Assuming 15 per cent. per annum for depreciation and 7 per cent. for interest on capital, find the most economical evaporator temperature and size of cooler, when power costs 0.6d./kWh. The coefficient of heat transmission may be taken as 200 kg. cals./sq. m./hr./° C. The temperature in the evaporator may be taken as uniform throughout the cooling surface. The overall efficiency of the refrigerating plant is 70 per cent. of theoretical. The plant is required to run for 300 working days of 24 hours in the year. For the purposes of this question capital charges on the refrigerating plant and the cost of cooling water need not be taken into account.

4. A surface condenser deals with 3,000 lb. of steam per hour, the total quantity of air entering being 2 lb. per hour. State what size of vacuum pump would theoretically be necessary to maintain a vacuum of 26½ in. at the vacuum pump suction, assuming :—(a) That the vapour and air mixture entering the pump is at 39° C., and (b) that the vapour and air mixture entering the pump is at 28° C. Discuss the practical significance of the results of this calculation.

5. Describe briefly what equipment you would employ for pulverising a limestone to a fineness of minus 100 mesh, starting with 8 in. lumps. State how you would test a grinding plant and how you would express the relation between screen analysis and power consumption

Section D—Part II.

6. Discuss, giving reasons for your choice, the process and plant you would recommend in any three of the following cases, and indicate clearly the nature of the constructional materials you would use :—(a) Filtration of calcium citrate in the manufacture of citric acid of high purity, (b) filtration of phosphoric acid in the production of the latter from phosphate rock, (c) filtration of ferric hydroxide, (d) separation of calcium sulphate from a hot solution of boric acid containing excess of sulphuric acid, (e) the treatment of coal washery effluent, or (f) removal of mucilage from linseed oil.

7. State what equipment you would employ for purifying an organic substance by three crystallisations from benzene. The substance may be assumed to have a melting-point of 80° C. and to be miscible with the solvent in all proportions at temperatures above 75° C. and soluble to the extent of 1 part in 10 parts of solvent at 30° C. Give a rough sketch of the apparatus proposed and indicate very approximately the dimensions for an output of 10 tons per week.

8. Discuss the underlying principles of vapour recompression evaporation. Indicate clearly what factors limit the economy possible in using the recompression system and state how far the same factors operate in limiting the thermal efficiency of multiple-effect plants.

9. Give a brief description of the type of drying plant you would employ in the following cases :—(a) Drying aniline colours collected from filter presses; initial moisture content 65 to 70 per cent.; output 1 ton per day; (b) production of anhydrous sodium acetate from a concentrated solution; out-

put 2 tons per day; (c) drying sulphur black; output 1 ton per hour; (d) drying salt as collected from a vacuum evaporating plant; output 1 ton per hour.

10. Describe the equipment you would employ for the extraction of a bark in the production of tanning extract, so as to obtain thorough extraction and at the same time the highest possible concentration. Give details of how you would arrange the parts of the installation and of the equipment you would provide for handling the liquors

Section E—Part I.

1. *Compulsory Question.*—Indicate in six only of the following cases (i) generally and briefly the type of apparatus you would employ under normal conditions in large scale practice, (ii) in detail, the materials of construction, and, generally, the type of fabrication of the plant (*i.e.*, riveted, welded, cast, forged, etc.), and (iii) roughly, the length of life of the particular portion subjected to severe corrosion:—

(a) Drying and screening of common salt; (b) decomposition of calcium tartrate with sulphuric acid, separation of calcium sulphate and evaporation of the liquor; (c) railway transport of concentrated hydrochloric acid; (d) crystallisation of copper sulphate; (e) evaporation of a solution of sodium bichromate; (f) crystallisation of Epsom salts; (g) separation of ammonium sulphate from mother liquor; (h) drying sodium hydrosulphite; (i) construction of a chute for a heavy abrasive material; (j) lining a rotary kiln for conversion of recovered calcium carbonate into lime; (k) manufacture of acetic anhydride from sodium acetate; (l) chlorination of benzene to chlorbenzene.

2. Calculate the essential dimensions for the design of a flanged cover joint of a riveted steel autoclave 5 ft. diameter for a working pressure of 100 lb./sq. in , giving full details of bolts, flanges and method of fixing.

3. Give particulars, with wiring diagrams, of the connections and switchgear you would recommend for:—(a) A 20 h.p., d.c. motor for driving an air compressor, and (b) a 70 h.p., 3-phase, a.c. motor for driving directly a disintegrator at a speed of 2,900 to 3,000 r.p.m.

4. A reciprocating vacuum pump has a clearance between the piston and cylinder end of x per cent. State approximately the theoretically attainable end vacuum of the pump when operating with a closed suction:—(a) For a simple pump, and (b) for a pump with "pressure equalisation" device. Calculate approximately the size of pump (displacement in cu. ft. per minute) required to exhaust a vessel of 1,500 cu. ft. capacity from atmospheric pressure down to 40 mm. Hg. absolute in 15 minutes, given that the pump will be selected from a series having an end vacuum of 10 mm. absolute.

5. Explain precisely what you understand by the following: Elastic limit; fatigue limit; stress concentration; elastic stability; corrosion fatigue; creep stress limit. Indicate what practical significance you attach to each.

Section E—Part II.

6. Give a general description of the method of fabrication of a riveted steel storage tank 30 ft. long and 8 ft. diameter. Discuss briefly the question of the strength of riveted joints for pressure vessel work.

7. Give briefly the outlines of a scheme of organisation for "progressing" the erection of a chemical plant, explaining what arrangements you would make for (a) the competitive purchase of supplies of plant and constructional material; (b) the control of completion dates so that the work could proceed in an uninterrupted manner, and (c) the inspection of deliveries.

8. Write a short essay on the "Legal obligations of the chemical manufacturer to his workmen and his neighbours."

9. Describe two types of water softening plant suitable for the treatment of 10,000 gal. per day of water of 16° total hardness. Estimate the cost of reagents in each case. State which type you would select for treatment of boiler feed water and what precautions you would adopt if the boilers were of the high-pressure water tube type.

10. Give a full list of the fittings and accessories you would provide on a Lancashire type boiler and explain the exact purpose of each item.

Section F.

Make a working drawing of a vertical surface condenser with 50 sq. ft. of cooling surface, composed of tubes $\frac{3}{4}$ in. internal diameter 3 ft. 3 in. long.

George Kimball Burgess

A Biographical Note

FOLLOWING the sudden death on July 2 of Dr. G. K. Burgess, the news edition of "Industrial and Engineering Chemistry" gives some biographical notes which will be of interest to those readers of THE CHEMICAL AGE who knew Dr. Burgess in his official capacity as Director of the Bureau of Standards, at Washington.

Born at Newton, Mass., January 4, 1874, Dr. Burgess came of an old New England family. He received the degree of B.Sc. from Massachusetts Institute of Technology in 1896. He pursued advanced scientific courses at the University of Paris from 1898 to 1900 and in 1901 that institution conferred upon him the degree of Doctor of Science. After the completion of his studies in Paris, he served on the faculties of the University of Michigan and the University of California. It was on July 8, 1903, that he entered the service of the Bureau of Standards, only two years after the establishment of that institution. Here he achieved an international reputation in the fields of high temperature measurement and metallurgy, being the first to develop a method for the accurate measurement of the temperature of railroad rails during the process of hot rolling. With his colleague, C. W. Waidner, then chief of the heat division of the Bureau, he suggested a natural reproducible standard of light, which after twenty years is recognised as one of the most fundamental and practical contributions to the field of photometry.

In April, 1923, Dr. Burgess was appointed by President Harding, on the recommendation of the then Secretary of Commerce, Herbert Hoover, to the post of Director of the Bureau of Standards, to succeed S. W. Stratton, who had accepted the presidency of Massachusetts Institute of Technology. In the nine years of his administration the bureau has grown in the value and variety of its work. He was particularly interested in every field in which the Bureau could co-operate with American industries towards the solution of scientific and technical problems on a sound fundamental basis, and it was under his guidance that the research associate plan, by which industrial organisations are enabled to send to the Bureau experts to work on problems in their particular field, was developed. This research associate plan has proved one of the most valuable ways in which the Government co-operates with American manufacturers and consumers and has assured the prompt application of research results to manufacturing processes, with a better quality of finished product for the consumer.

Polish Turpentine Industry

THE Polish Turpentine Association, which suspended turpentine production on February 15, on account of unfavourable export trade has resumed operation of the plants with a considerable improvement in export trade. Until recently the domestic turpentine industry was organised into two cartels, one composed of producers, founded in June, 1931, as their purchasing organisation with headquarters in Bialystok and the other established in October, 1931, by the turpentine refiners as the central cartel organisation in Warsaw. The latter organisation was liquidated in April, as a number of turpentine refiners were not members and severe competition was being met with these outside firms. It is expected that the other cartel will also be liquidated in the near future.

Colloid Chemistry

The Tenth Colloid Symposium at Ottawa

A WIDE range of subjects was included in a series of some 27 papers, by outstanding authorities in their respective fields, at the tenth Colloid Symposium, held in Ottawa on June 16-18. The sessions were held in the new laboratories of the National Research Council, and delegates were present from all parts of Canada and the United States, as well as from England and Belgium. On the opening day, a Board of Trade luncheon was held, presided over by Mr. D. P. Cruikshanks, president of the Ottawa Board of Trade, at which Sir George Perley, Dr. Emil Hatschek and Dr. G. S. Whitby were the speakers.

Dr. Emil Hatschek, lecturer in colloid chemistry at the Sir John Cass Technical Institute, London, was the guest of honour, and in addition to giving a technical paper he presented a popular lecture on "Jellies," illustrated by experiments. In his technical paper on "The Study of Gels by Physical Methods" he indicated the specific direction of strength in the gels under study and showed how the nature of air bubbles might affect strength according to the orientation of these bubbles. He gave results on the measurements of elasticity of various gels, including silica gel, which had not been measured before.

Rubber Hydrocarbons

Thomas Midgley and Albert L. Henne, Ohio State University, presented a paper on "The Separation and Identification of Sol Rubber Hydrocarbons." They showed that the idea that sol and gel rubber constitute a two-phase system is based on inadequate experimental method and erroneous interpretation of the fragmentary data obtained by these methods. A new procedure of fractionation, based on precipitation from a benzene-alcohol mixture at different temperatures, was offered, together with a standardised physical constant to follow the progress of the fractionation. The experimental results showed that the rubber hydrocarbons constitute a one-phase system.

In their paper "The Insolubilisation of Gelatin by Heat," S. E. Sheppard and R. C. Houck, of the Eastern Kodak Co., gave the results of a quantitative study of the loss of swelling and solubility in water by gelatin on prolonged heating. The rate of insolubilisation, as measured by reduction in swelling capacity, is a marked function of temperature. The reaction is of the bi-molecular order, and insolubilisation by ultra-violet light was found to follow the same reaction course, though at greater velocity than that at the highest temperature studied (116° C.). They conclude that the conversion of collagen to gelatin involves something more than the disorientation of long chain molecules assembled in crystallites. The facts suggest hydrolytic disruption of definite chemical interlinkages between these long chains.

Colloid Chemistry of Asphalts

Charles Mack, of the Imperial Oil Co. discussed the "Colloid Chemistry of Asphalts." Asphalts have been considered as a sol of asphaltenes in a mixture of asphaltic resins and oily constituents. Viscosity measurements have shown that asphalts have high relative viscosities at lower temperatures only, whereas in the liquid state they behave like ideal solutions. Structural viscosity has not been found to occur in the asphalts which have been investigated; it is probable, however, that it is more pronounced with higher concentrations of asphaltenes. An equation has been developed to calculate the molecular weight of the solute from viscosity measurements: Log (relative viscosity) = C.k.M., where C denotes concentration in weight present, k is a constant, and M the molecular weight. The application of this equation, together with adsorption measurements of asphaltic resins on asphaltenes, seem to indicate that, contrary to general opinion, high relative viscosity is brought about by association rather than by solvation. Von Weiman's equation dealing with particle size and degree of supersaturation was found to hold qualitatively for asphalts from two different sources which have the same asphaltene content but show differences of susceptibility with respect to temperature change.

C. H. Winning and J. W. Williams, in "The Sorption of Organic Vapours by Glyptal Resins," outlined results obtained at the University of Wisconsin in a sorption balance study of the equilibrium of glyceryl phthalate resins in the presence of acetone and methyl alcohol vapours. The results indicate that this resin is an elastic rather than a rigid gel, because it deforms and swells as the sorption progresses. The isotherms deviate from the typical S-shaped curves characteristic of such substances as cellulose, starch, mercerised cotton, wool and other proteins. The deviations are believed to be due to the fact that in glyptal the voids do not become interconnecting until some of the sorbed vapours have been able to overcome the natural cohesion of the micells and penetrate between them. This causes an initial lag in the sorption process as the structure is being progressively opened up. Experiments of this type make possible a basis for the scientific comparison of different resins. In addition, they should be significant for the plastics and varnish industries because they give information concerning their rigidity and retention of vapours.

Filtration Phenomena

Miss May Annetts, University of Toronto, dealt with "Filtration Phenomena in Colloids." She outlined the changes that may take place in filtering colloidal solutions and offered an explanation of the reasons for these changes. Poor filter papers have a greater effect than high-grade ashless filters because of the contamination of the colloid solution by the soluble materials washed out of the filter paper during filtration, but the effects can be reduced by successive washings of poor filter paper with distilled water. It is suggested that the changes observed are due to a combination of two effects —increased conductivity in the sol due to the addition of electrolytic impurities washed out of the filter paper, and decreased conductivity due to the adsorption of hydrogen ions by the filter paper.

A review of "Research on Cane Wax in Raw and Refined Sugars" was given by C. F. Bardorf and J. A. B. Ball, of the St. Lawrence Sugar Refineries. Cane wax is the most troublesome of all the impurities which have to be dealt with by the defecation method, because it adheres so tenaciously to any solids with which it comes in contact. There are four classes of colloid material in low and refined sugar; acetone soluble soft wax (m.p. 52° C.), alcohol soluble brittle wax (m.p. 82° C.), water soluble, and insoluble (containing nitrogen compounds). Acetone and alcohol soluble constituents and the cane wax complex itself are tenaciously retained by such materials as filtercloth, diatomite, paper pulp and bone black.

Dr. A. L. Elder and Naoma O. Green, Syracuse University, presented a short paper on "Colloidal Boron." The colloidal metal had been prepared by fusing metallic magnesium with boric acid, and taking up the metallic boron particles in a water suspension. Other papers contributed by outstanding authorities included "The Sorption of Vapours on Cellulose," by N. H. Grace and O. Maass; "The Sorption of Sodium Hydroxide on Cellulose and Wood," by R. Richardson and O. Maass, McGill University; "Some Applications of the Stern Theory," by Frank Urban and H. L. White, Washington University; "The Decomposition of Dimethyl Ether on the Surface of Platinum," by E. W. R. Steacie and H. A. Reeve, McGill University; and "A New Theory of Emulsion," by C. H. M. Roberts, Petroleum Rectifying Co., of California.

The Future of Cosach

Scheme Prepared

IT is reported that the general outline has been prepared of the plan for the reorganisation of the Chilean nitrate combine, Cosach. The plan is stated to include the conversion of a large part of the mortgage debts into three series of income bonds and preferred stock, with a reduction of interest rates on prior obligations. An effort will be made to obtain British approval of the plan.

The Dyeing of Viscose

Working Instructions for Present-Day Methods

The following notes are based on information supplied by Imperial Chemical Industries, Ltd., who have recently issued a series of colour cards on this subject, giving dyeing instructions in English, French and German.

OF the several classes of dyestuffs employed for the dyeing of viscose and the other artificial fibres of the regenerated cellulose type the Chlorazol colours are of the greatest importance as they combine simplicity of operation with average brilliancy and fastness. Where the brightest shades are demanded it is necessary to use the basic colours but the shades produced are generally less fast than those obtained with the Chlorazol colours. When dyeing with the basic colours a more prolonged working of the goods is necessitated, which should be avoided as much as possible. The Thionol, Caledon and Durindone colours are employed when a high degree of fastness is essential. A problem peculiar to the dyeing of artificial silk of the viscose type, is the result of certain difficulties connected with the manufacture of viscose filament. Without discussing the reasons for this, it may be said that the effect is that in the same batch of silk, even within the same skein, various portions of the filament are liable to show varying affinity for dyestuffs. Hence, hanks sometimes emerge from the dyebath with a very uneven appearance, and piece goods, both knitted and woven, may show stripes and markings of more heavily or more lightly dyed places, termed "bar lines" or "weft bars," which seriously impair their saleability. It is with a view to overcoming these defects that a special series of dyestuffs has been marketed under the name Icyl colours, but certain of the Chlorazol colours also possess the property of giving even shades on variable viscose.

Chlorazol and Icyl Colours

In using the Chlorazol and Icyl colours the dyestuff is made into a paste with cold water and then dissolved by the addition of boiling water. Condensed water is the most satisfactory for the purpose; hard water should be boiled with the addition of a small quantity of soda ash before use. The dyeing temperature and the amount of Glauber or common salt have a direct bearing on the even dyeing of material containing fibres of irregular quality. It has been proved in practice that the best results are obtained by dyeing at temperatures between 185° to 200° F. and with a minimum addition to the bath of Glauber or common salt or, better still, none at all. The addition of Glauber salt tends to emphasise any tendency the material may possess towards irregular absorption of dyestuff.

Complete exhaustion of the bath is not desirable or to be expected when dyeing under these conditions, but there is ample compensation in the even results obtained by the adoption of this dyeing method. This departure from the usual method of dyeing direct colours renders it inadvisable to allow the material to lie wet for any length of time after withdrawal from the dyebath. If the goods are so left, dyeing will still proceed with the consequent production of unlevel results.

Producing Even Results

Should it be necessary to allow the wet goods to lie, an alternative method is to enter the material at the maximum temperature and allow the dyeing to proceed in the cooling liquor. This may result in slightly less covering of the irregularities but it will be found a useful compromise as the dyebath is more completely exhausted. The method recommended is given with a view to producing the most even results on variable material but it will be understood that when it is known definitely that the material to be dyed is of equal quality dyeing may be conducted in the normal manner using 5 to 30 per cent. of Glauber salt crystals to exhaust the bath. The Chlorazol and Icyl colours may with advantage be dyed with the addition to the dyebath of soap, soluble oil or soda ash except when dyeing Chlorazol Yellow GS, Chlorazol Yellow RS, Chlorazol Fast Yellow 5GKS, Chlorazol Fast Orange DS and Chlorazol Green BNS when soda ash should be omitted. When using Chlorazol Fast Yellow 5GKS it is advisable to dissolve a little soap with the dyestuff and to make an addition of 2 per cent. of sodium phosphate to the dyebath. In the production of combination shades it is preferable to employ only those dyestuffs of the same class as regards their even dyeing property, as otherwise the tone as well as the depth of shade may be liable to vary on different portions of the same hank or piece.

Certain dyestuffs may be diazotised on the fibre by a treatment with sodium nitrite and acid and developed with various developers such as beta-naphthol, meta-phenylenediamine or meta-toluylenediamine. By this process the shades are modified or entirely changed while the fastness to washing and cross-dyeing is considerably increased. The dyed and rinsed material is worked for 20 minutes in a cold bath containing, according to the depth of shade, 1½ to 2½ per cent. sodium nitrite and 5 to 7½ per cent. hydrochloric acid (32° Tw.), or 3 to 5 per cent. sulphuric acid (168° Tw.). It is then rinsed in acidulated cold water and developed without delay by working for 20 minutes in a fresh bath containing 1 to 3 per cent. of developer, dependent on the depth of shade.

Basic Colours

The basic dyestuffs possess a certain degree of direct affinity for viscose and frequently advantage is taken of this fact to produce dyeings without the necessity of first mordanting the fibre. This method of dyeing is only applicable in the case of light shades and has the advantage that viscose of varying quality yields even dyeings, against which advantage must be set the fact that such shades are less fast to light and washing than dyeings produced on a tannin-antimony mordant. The fastness properties are improved by "back-tanning" after dyeing.

In mordanting the material is worked for 1 to 2 hours at 140 to 160° F. in a short bath containing 1 to 5 per cent. of tannic acid, according to the depth of shade to be dyed. It is then wrung or hydro-extracted without rinsing, treated for 15 to 30 minutes in a cold bath prepared with 0.5 to 2.5 per cent. of tartar emetic, and finally wrung, rinsed and dyed without drying. The dyestuff is mixed to a paste with an equal weight of acetic acid (30 per cent.) and boiling water is poured upon it, stirring until dissolved. The dyebath is then prepared with 2 to 5 per cent. acetic acid (30 per cent.). The acetic acid is used for the dual purpose of correcting the hardness of the water and to retard the rate of dyeing. The lighter the shade being dyed the greater is the amount of acid required. The material is entered into the cold dyebath and the temperature raised gradually to 120 to 140° F. and dyeing is continued at this temperature until no further exhaustion takes place. It is advisable, especially in the case of light shades, to add the dissolved dyestuff in two or three portions, the final addition being made before raising the temperature of the bath.

Thionol Colours

Here the dyestuff and the necessary amount of sodium sulphide together with 2 per cent. of soda ash are made into a paste with cold water and then dissolved by the addition of boiling water. The dyebath is prepared with the necessary amount of dissolved dyestuff and 5 to 15 per cent. of common salt, or 10 to 30 per cent. of Glauber salt crystals, according to the depth of shade being dyed. An addition of 2 to 3 per cent. of soap or Turkey Red Oil 50 per cent. is advantageous. Dyeing is conducted at 180 to 190° F. for ½ to 1 hour except in the case of certain colours, which should be dyed at 120° F.; these colours include Thionol Brilliant Green GS, Thionol Blue 2BS, Thionol Indigo Blue 2RS, Thionol Sky Blue PS and Thionol Sky Blue 6BS. Dyeings made with Thionol Corinth 2RS and Thionol Red Brown 3RS gradually become redder and brighter on exposure to the atmosphere. This change is due to their lack of fastness to acids and the final shade can be attained by rinsing the dyed material in a cold bath containing a little acetic acid. Thionol Navy Blues XXS and XX2B, Thionol Sky Blue FFS and Thionol Green BS become considerably brighter by after-treatment by oxidising agents.

Vat dyestuffs are finding an increasing use on viscose on account of the present day demand for greater fastness. The

Caledon colours, which are derivatives of anthraquinone, are of the greater importance in this respect and the series includes dyestuffs which, in regard to fastness to light, washing and chlorine, satisfy the highest demands for guaranteed goods.

The Durindone colours are indigoid derivatives and though, as a class, they are of somewhat inferior fastness as compared with the Caledon range, individual members possess excellent fastness to chlorine and cross-dyeing and find considerable use on that account. Owing to the very great affinity of the majority of the vat colours for the viscose fibre, however, the processes for applying them on viscose require several slight modifications in comparison with the methods used when dyeing cotton. Whilst the general principle, that of reduction with sodium hydrosulphite and solution of the leuco body in caustic soda, remains the same, means have to be adopted to reduce the affinity to a degree where the best possible condition as regards level dyeing is obtained. This condition can be brought about by (1) an increase in the ratio of dye liquor to material; (2) a variation in the amounts of caustic soda and hydrosulphite in the dyebath; (3) the addition of soap or Turkey Red Oil 50 per cent. to the dyebath; (4) an adjustment of the dyeing temperature (in certain cases it is found that 110 to 120° F. is the best general temperature); or (5) the use of retarding and dispersing agents such as glue and Perminal W.

Use of Soft Water

Soft water should be used for the dissolving and dyeing of Caledon colours. If this is unobtainable it is advisable to add 1 lb. of soda ash per 100 gallons of water. The recommended method of solution is in the so-called "stock vat," *i.e.*, in a concentrated solution in a vessel apart from the dyebath, using half of the indicated quantities of caustic soda and hydrosulphite. In this method 10 to 15 minutes are allowed for vatting to take place, and the solution is then added to the dyebath containing the remainder of the caustic soda and hydrosulphite appropriate for the particular dyestuffs in use. Using the dyebath, if more convenient, the dyebath is filled with water, the caustic soda added and the temperature raised to 110 to 120° F. Any lime salts which rise to the surface are skimmed off and the hydrosulphite powder is stirred in. The dyestuff, previously made to a thin paste with water, is added and after 15 to 20 minutes, with occasional stirring, solution should have taken place. Any assistants of the nature of soap, oil, glue or Perminal W are then added.

The material is dyed in the customary manner but must be turned very smartly on first entering to avoid any tendency to "ending." The actual dyeing process is complete after 20 to 30 minutes working. When working by the stock vat method, the dissolved dyestuff may be added to the dyebath in two or three portions, with a reduction in the danger of "ending." On being removed from the bath the material is rinsed in cold water and oxidised by exposure to the air, or by giving a few turns in a cold solution of sodium hypochlorite ½° Tw., souring in dilute acid and washing. Sodium hypochlorite should not be used in the case of dyestuffs not fast to chlorine. Finally, the material is given three or four turns in a soap solution of 200° F. and rinsed well in warm water; 2½ to 5 lb. of soap in 200 gallons of water is a convenient strength for the soap bath. In the case of Caledon Black 2BS and Caledon Black BGA treatment with sodium hypochlorite prior to soaping is essential in order to develop the shade.

The Durindone Colours

The Durindone colours are dissolved by the stock vat method using caustic soda, hydrosulphite and Turkey Red oil. When vatting is complete the solution is added to the dyebath, set at the correct temperature for dyeing and sharpened with half pint of caustic soda 53° Tw. and 6 oz. of hydrosulphite conc. powder. In dyeing the material is worked for ½ to ¾ hour and as the leuco compounds are very soluble and oxidise slowly in the air care should be taken that ample time is allowed for complete oxidation, afterwards rinsing, souring and again rinsing. Dyeings made with Durindone dyestuffs are finally soaped at 200° F. for half an hour except those made with Durindone Red YS which are soaped at 160° F. Durindone Red BS and Durindone Scarlet YS are dried without soaping. An addition to the dyebath of 1½ to 2 lb. of soap or Turkey Red oil 50 per cent. or of 2 lb. of glue and 2 lb. of Perminal W is recommended in order to assist in obtaining level results.

The Sulphuric Acid Contact Process

United States Patent Litigation

THE United States District Court for Pennsylvania (Western District) has dismissed with costs the bill brought by the General Chemical Co. against the Selden Co. for infringement of its Slama and Wolf patent, No. 1,371,004, for the oxidation of sulphur dioxide and catalyst therefor. Claim 7 of this patent was held invalid, while claims 1 to 6 and 8 were held valid but not infringed.

The invention of the Slama and Wolf patent consists in the use of a vanadium catalyst dispersed on a carrier having an extreme fineness of division in the contact process of sulphuric acid manufacture. The fineness specified in all claims but claim 7 is that of 60 microns or less in diameter. Ground pumice, kieselguhr, precipitated silicic acid, stannic oxide, etc., and mixtures of these are mentioned as suitable carriers. In the specification of the patent it is said that the addition of the hydroxides, carbonates, sulphates, or nitrates of potassium or sodium protects the catalyst from deterioration. Heating in air, in the absence of SO_2, is said to remove hydroscop tendencies. The catalyst can be mixed with a binding agent and moulded or pressed into any desired shape.

The court found as facts that the catalyst manufactured by the Selden Co. comprises a vanadium compound dispersed upon pellets of a potassium aluminosilicate (zeolite) having a particle size greater than 100 microns in diameter, the zeolite having imbedded therein particles of finely ground kieselguhr. The vanadium compound is distributed on the zeolite rather than on the kieselguhr particles. The potash used in making the zeolite is not employed to protect the catalyst from deteriorating in catalytic activity. This catalyst was found to have certain advantages over the catalyst of the patent, both having important advantages over the platinum catalyst which they are rapidly replacing in the industry. Vanadium catalysts were old; pumice and kieselguhr as carriers were old; fineness of division in the carriers of other catalysts for other processes were old; but no person before the patent in suit had been able to produce a commercially efficient vanadium catalyst. The patentees solved this problem in an art wherein prediction or reasoning from analogy is impossible.

During prosecution of the patent application an amendment was inserted, without supplemental oath, limiting the particle size of the carrier to below 60 microns. As filed, the application had specified the size as not exceeding 20 microns or as preferably 1 micron in diameter, this being limited, however, by general statements that larger sizes could be used. The court held that the amendment limiting the size to below 60 microns did not constitute "new matter" but only defined the invention more specifically. Although the patent was applied for in 1914 and granted in 1921, the General Chemical Co. made no use of the catalyst of the patent until 1929, after having been spurred into activity by the success of the Selden Co., the latter having since 1927 installed its catalyst in plants having a capacity of 1500 tons of sulphuric acid per day. For these reasons the court held that the patent must be restricted to the specific embodiment of the invention disclosed. Claim 7 was held invalid as being too broad in not specifying particle size, fineness of subdivision being the essence of the invention. The remaining claims were held valid but not infringed, since the particle size of defendant's carrier was greater than the 60 microns called for by these claims.

News from the Allied Industries

Non-Ferrous Metals

IN THE REPORT OF THE ADVISORY COMMITTEE for the Metalliferous Mining and Quarrying Industry, issued on August 2, there is a suggestion that a compilation of comprehensive plans of the adits of the tin mines in Cornwall and Devon should be made. Proposals are submitted for a drainage scheme for the Camborne-Redruth area, which presuppose the amalgamation of the mines in the southern part of the area. The committee advocates that the Mines Department should consider the possibility of arranging for research being undertaken with a view to increasing the percentage of metal recoverable in dressing tin ore, improving the commercial grade of British fluorspar and improving the grade of British barytes.

Mineral Oil

THE ASSETS OF THE RICHFIELD OIL CO., Los Angeles, have been purchased by the Sinclair Consolidated Oil Corporation for $22,250,000.

THE INTERNATIONAL OIL CONFERENCE, which has adjourned until its next meeting in New York during September, is reported to be considering an increase in prices by 25 per cent. as from October 1. The actual fixation of prices is, however to become the subject of further discussion. The greater part of the discussions in Paris has been devoted to various fields of distribution with a view to preventing undue competition. The oil interests represented at the conference amounted to 80 per cent. of the world's supplies.

Tanning

THE 29TH ANNUAL MEETING of the American Leather Chemists' Association was held at Atlantic City, New Jersey, May 26-28, when Dr. R. W. Frey, in his presidential address, suggested that the Reiss method of filtering tannin solutions in the course of tanning material analysis was worthy of close study by the Association. This was one of the methods made official by the I.S.L.T.C. and I.V.L.I.C. at the Basle Conference, and it might prove to be a common meeting ground for the international and American methods of tanning material analysis. At the close of the session, at which the Leather and Gelatin Section of the American Chemical Society also participated, Dr. G. D. McLaughlin, of the Eisendrath Memorial Laboratory, Racine, Wis., was elected as the new president of the association.

Synthetic Manures

THE Indian Imperial Council of Agricultural Research has sanctioned funds for the conduct of researches on the manufacture of synthetic manures from waste materials, extension of studies on sewage farming, and researches on qualities in crops, and these funds have been placed at the disposal of the Institute. The Institute is also asked to prepare and submit other schemes or other fundamental agricultural problems. The results of these researches will come into application in course of time. The total imports of manures into India during the year 1931-32 declined from 59,000 tons in the previous year to 34,000 tons, which is a very heavy decline. The trade was steadily expanding for some years past, and the decline is to be attributed to the general agricultural depression in India. In 1929-30 the imports amounted to 78,000 tons. During these two years, the imports of nitrate of soda fell from 11,000 tons to 2,000 tons; sulphate of ammonia, from 24,000 tons to 16,000 tons; muriate of potash, from 7,000 tons to 5,000 tons and phosphatic manures, from 30,000 to 4,000 tons.

Iron and Steel

IT WAS OFFICIALLY STATED at Swansea on July 29 that the Iron and Steel Confederation had been informed by Richard Thomas and Co. that they had agreed to the procedure of allowing the matters in dispute at their South Wales Steelworks, Llanelly, to be dealt with in accordance with trade custom. The notices served on 600 workmen, which were to be effective on July 30, were therefore withdrawn. The points in the dispute related to wages and conditions.

FURTHER experiments on the corrosion-resistance of nickel-chromium austenitic steels which are reported in a recent issue of "Comptes Rendus," have shown that a steel containing 8 per cent. nickel, and 18 per cent. chromium, while immune from attack by cold phosphoric acid solutions, is rapidly attacked if the solution contains even a small amount of hydrochloric acid. In general, the more concentrated the phosphoric acid solution, the smaller is the amount of hydrochloric acid required to produce susceptibility; the effect of surface condition on corrosion-resistance varies with the concentration of the solution. These experiments covered determinations of loss in weight, and an investigation of the variation in the potential of the alloy in reference to a hydrogen electrode immersed in the corroding reagent.

Chemical Industry Lawn Tennis Tournament

The Semi-Finalists

THE four matches in the fourth round of the Chemical Industry Lawn Tennis Tournament should have been concluded by Monday last, but one of the matches unfortunately had to be scratched owing to the removal of one of the players to another part of the country. The fourth round results appear below.

The draw for the semi-finals has resulted in two pairs representing the Monsanto Chemical Works, Ltd., being called upon to play each other, one from London and one from Ruabon, North Wales, the London pair having choice of ground. The other match will be between pairs representing Doulton and Co., Ltd., and the British Oxygen Co., Ltd.

The final will be played at Blunt House, Oxted, by kind permission of Sir Ernest and Lady Benn, on Saturday, September 10.

The semi-final matches must be played by August 22, and the results, signed by all four players (winners and losers) must be sent by the winners to the Editor of THE CHEMICAL AGE, Bouverie House, Fleet Street, E.C.4, immediately after each match, to reach us not later than 9.30 a.m. on Wednesday, August 24.

Fourth Round Results

The results of the fourth round matches are as follows:—

S. E. Chaloner and W. Speakman (Monsanto Chemical Works, Ltd., Ruabon) beat Idris Williams and T. Clarke (Monsanto Chemical Works, Ltd., Ruabon), 7—5, 6—2.

J. W. Urban and F. S. Mortimer (Monsanto Chemical Works, Ltd., London) beat A. Collins and H. Sibley (British Oxygen Co., Ltd.), 5—7, 6—4, 6—4.

C. G. Copp and W. W. Marchant (Doulton and Co., Ltd.), walk over, A. G. R. Clarke and F. E. Peake (G. A. Harvey and Co., Ltd.) scratched.

G. F. Hammond and L. Giltrow (Williams, Hounslow, Ltd.) beat E. Thomsett and R. Welsh (British Oxygen Co., Ltd.), 6—2, 6—3.

Draw for the Semi-Final

Following are the details of the semi-final draw. Matches must be played by **August 22**, and the results must reach the Editor of THE CHEMICAL AGE by 9.30 a.m. on August 24 at the latest.

J. W. Urban and **F. S. Mortimer**
Monsanto Chemical Works, Ltd., London, S.W.1. (Victoria 1535.)

v

S. E. Chaloner and **W. Speakman**
Monsanto Chemical Works, Ltd., Ruabon, N. Wales. (Phone: Ruabon 3.)

C. G. Copp and **W. W. Marchant**
Doulton & Co., Ltd., High Street, Lambeth, S.E.1. (Phone: Reliance 1241.)

v

G. F. Hammond and **L. Giltrow**
Williams (Hounslow), Ltd. (Phone: Hounslow 2929.)

Weekly Prices of British Chemical Products

Review of Current Market Conditions

The following notes on the chemical market conditions in Great Britain are based on direct information supplied by the British manufacturers concerned, and unless otherwise qualified the figures quoted apply to fair quantities, net and naked at makers' works. Where no locality is indicated, the prices are general for the United Kingdom. Particulars of the London chemical market are specially supplied to THE CHEMICAL AGE by R. W. Greeff and Co., Ltd., and Chas. Page and Co., Ltd., and those of the Scottish chemical market by Chas. Tennant and Co., Ltd.

THE demand for chemicals during the current week has been a little better, with prices generally steady. There is no change to report in the market for coal tar products, prices remaining firm. The Bank Holiday has had a distinctly quietening effect on business in chemicals on the Manchester market during the past week, and most traders report very moderate bookings, with forward buying interest extremely dull. For the same reason, there has been some interference with deliveries into consumption, although these are expected to continue on a limited scale during the greater part of the present month if not well into September. Quotations remain steady generally. Business in the Scottish market has been a little better during the week.

General Chemicals

ACETONE.—LONDON: £65 to £68 per ton; SCOTLAND: £66 to £68 ex wharf, according to quantity.

ACID, ACETIC.—Tech. 80%, £37 5s. to £39 5s.; pure 80% £38 5s. to £40 5s.; tech., 40%, £19 15s. to £21 15s.; tech., 60%, £28 10s. to £30 10s. SCOTLAND: Glacial 98/100%, £48 to £50; pure 80%, £38 5s.; tech. 80%, £37 5s. d/d buyers' premises Great Britain. MANCHESTER: 80%, commercial, £39; tech. glacial, £52.

ACID, BORIC.—SCOTLAND: Granulated commercial, £26 10s. per ton; B.P. crystals, £35 10s.; B.P. powder, £36 10s. in 1-cwt. bags d/d free Great Britain in one-ton lots upwards.

ACID, CHROMIC.—11d. per lb., less 2½% d/d U.K.

ACID, CITRIC.—1s. 0½d. per lb. LONDON: 1s. 0½d., less 5%. MANCHESTER: 1s. 0¼d. to 1s. 0½d.

ACID, CRESYLIC.—97/99%, 1s. 5d. to 1s. 7d. per gal.; 99/100%, 1s. 9d. to 2s.

ACID, FORMIC.—LONDON: £48 per ton.

ACID, HYDROCHLORIC.—Spot, 3s. 9d. to 6s. carboy d/d according to purity, strength and locality. SCOTLAND: Arsenical quality, 4s.; dearsenicated, 5s. ex works, full wagon loads.

ACID, LACTIC.—LANCASHIRE: Dark tech., 50% by vol., £24 10s. per ton; 50% by weight, £28 10s.; pale tech., 50% by vol., £28; 50% by weight, £33; 80% by weight, £53; edible, 50% by vol., £41. One-ton lots ex works, barrels free.

ACID, NITRIC.—80° Tw. spot, £20 to £25 per ton makers' works, according to district and quality. SCOTLAND: 80°, £23 ex station full truck loads.

ACID, OXALIC.—LONDON: £45 10s. per ton in casks, £48 10s. to £52 10s. in kegs. SCOTLAND: 98/100%, £49 to £52 ex store. MANCHESTER: £47, ex store.

ACID, SULPHURIC.—Average prices f.o.r. British makers' works, with slight variations owing to local considerations: 140° Tw. crude acid, £3 per ton; 168° Tw. arsenical £5 10s.; 168° Tw. non-arsenical, £6 15s. SCOTLAND: 144° quality, £3 12s. 6d.; 168°, £7; dearsenicated, 20s. per ton extra.

ACID, TARTARIC.—1s. 0½d. per lb. SCOTLAND: B.P. crystals, 1s. 1d. to 1s 1½d., less 5%, carriage paid. MANCHESTER: 1s. 0¼d. to 1s. 0½d.

ALUM.—SCOTLAND: Lump potash, £9 per ton ex store.

ALUMINA SULPHATE.—LONDON: £8 5s. to £9 10s. per ton. SCOTLAND: £8 to £8 10s. ex store.

AMMONIA, ANHYDROUS.—Spot, 10d. per lb. d/d in cylinders. SCOTLAND: 10d. to 1s. containers extra and returnable.

AMMONIA, LIQUID.—SCOTLAND: 80°, 2½d. to 3d. per lb. d/d.

AMMONIUM BICHROMATE.—8d. per lb. d/d U.K.

AMMONIUM CARBONATE.—SCOTLAND: Lump, £36 per ton; powdered, £38, in 5-cwt. casks d/d U.K. stations or f.o.b. U.K. ports.

AMMONIUM CHLORIDE.—£37 to £45 per ton, carriage paid. LONDON: Fine white crystals, £19 to £20. (See also Salammoniac.)

AMMONIUM CHLORIDE (MURIATE).—SCOTLAND: British dog tooth crystals, £32 to £35 per ton, carriage paid according to quantity. (See also Salammoniac.)

ANTIMONY OXIDE.—SCOTLAND: Spot, £22 per ton, c.i.f. U.K. ports.

ANTIMONY SULPHIDE.—Golden 6½d. to 1s. 1½d. per lb.; crimson, 1s. 4d. to 1s. 6d. per lb. according to quality.

ARSENIC.—LONDON: £24 10s. c.i.f. main U.K. ports for imported material; Cornish nominal, £26 10s. f.o.r. mines. SCOTLAND: White powdered £27 ex wharf; spot, £27 10s. ex store. MANCHESTER: White powdered Cornish, £25 10s. at mines.

ARSENIC SULPHIDE.—Yellow 1s. 6d. to 1s. 8d. per lb.

BARIUM CHLORIDE.—£11 to £11 10s. per ton.

BISULPHITE OF LIME.—£7 10s. per ton f.o.r. London, packages free.

BLEACHING POWDER.—Spot 35/37% £7 10s. per ton d/d station in casks, special terms for contract. SCOTLAND: £8 15s. in 5/6 cwt. casks.

BORAX, COMMERCIAL.—Granulated £15 10s. per ton, powder £17, packed in 1-cwt. bags, carriage paid any station Great Britain. Prices are for 1-ton lots and upwards.

CADMIUM SULPHIDE.—3s. 6d. to 3s. 9d. per lb.

CALCIUM CHLORIDE.—Solid 70/75% spot £5 5s. to £5 15s. per ton d/d station in drums.

CARBON BISULPHIDE.—£30 to £32 per ton, drums extra.

CARBON BLACK.—4½d. to 5½d. per lb., ex wharf.

CARBON TETRACHLORIDE.—£45 to £55 per ton, drums extra.

CHROMIUM OXIDE.—10d. to 10½d. per lb. according to quantity d/d U.K. Green 1s. 2d. per lb.

CHROMETAN.—Crystals 3¾d. per lb. Liquor £19 10s. per ton d/d.

COPPERAS (GREEN).—SCOTLAND: £3 15s. per ton, f.o.r., or ex works.

CREAM OF TARTAR.—LONDON: £4 12s. 6d. per cwt.

FORMALDEHYDE.—LONDON: £28 per ton. SCOTLAND: 40%, £28 10s. ex store.

LAMPBLACK.—£46 to £50 per ton.

LEAD, ACETATE.—LONDON: White, £36 to £37 per ton. Brown £1 per ton less. SCOTLAND: White Crystals £40 to £41 c.i.f. U.K. ports. Brown £1 per ton less. MANCHESTER: White, £34; Brown, £32.

LEAD NITRATE.—£28 per ton. MANCHESTER: £27 10s.

LEAD, RED.—SCOTLAND: £28 10s. per ton d/d buyer's works.

LEAD, WHITE.—SCOTLAND: £40 per ton carriage paid.

LITHOPONE.—30%, £19 to £21 per ton.

MAGNESITE.—SCOTLAND: Ground Calcined £9 per ton ex store.

METHYLATED SPIRIT.—61 O.P. Industrial 1s. 8d. to 2s. 3d. gal. Pyridinised Industrial, 1s. 10d. to 2s. 5d. Mineralised, 2s. 9d. to 3s. 3d. 64 O.P. 1d. extra in all cases. Prices according to quantities. SCOTLAND: Industrial 64 O.P., 1s. 9d. to 2s. 4d.

NICKEL AMMONIUM SULPHATE.—£38 per ton d/d.

NICKEL SULPHATE.—£38 per ton d/d.

PHENOL.—Small lots 6¼d. to 6½d. per lb. in 3-cwt. drums, bulk quantities down to 5½d. per lb., delivery free U.K.

POTASH, CAUSTIC.—LONDON: £42. MANCHESTER: £40.

POTASSIUM BICHROMATE.—Crystals and Granular, 5d. per lb. net d/d U.K. Discount according to quantity. Ground 5¾d. LONDON: 5d. per lb. with usual discounts for contracts. SCOTLAND: 5d. d/d U.K. or c.i.f. Irish Ports. MANCHESTER: 5d.

POTASSIUM CARBONATE.—SCOTLAND: 96/98% spot £28 per ton ex store. LONDON: £31 10s. to £32. MANCHESTER: £29 10s.

POTASSIUM CHLORATE.—3¾d. per lb. export London in 1-cwt. kegs. LONDON: £37 to £40 per ton. SCOTLAND: 99¼/100% powder, £34. MANCHESTER: £37.

POTASSIUM CHROMATE.—6½d. per lb. d/d U.K.

POTASSIUM NITRATE.—SCOTLAND: Refined Granulated £28 per ton c.i.f U.K. ports. Spot £30 per ton ex store.

POTASSIUM PERMANGANATE.—LONDON: 8¼d. per lb. SCOTLAND: B.P. crystals, 8¼d. MANCHESTER: Commercial, 8¼d.; B.P., 8¾d.

POTASSIUM PRUSSIATE.—LONDON: 8½d. to 9d. per lb. SCOTLAND: Yellow spot material, 8½d. ex store. MANCHESTER: Yellow, 8¼d.

SALAMMONIAC.—First lump spot, £42 17s. 6d. per ton d/d in barrels.

SODA ASH.—58% spot, £6 per ton f.o.r. in bags, special terms for contracts.

SODA, CAUSTIC.—Solid 76/77° spot £14 10s. per ton d/d station. SCOTLAND: Powdered 98/99% £17 10s. in drums, £18 15s. in casks. Solid 76/77% £14 10s. in drums 70/72% £14 12s. 6d. carriage paid buyer's station, minimum 4-ton lots; contracts 10s. per ton less. MANCHESTER: £12 15s. to £14 contracts.

SODA CRYSTALS.—Spot £5 to £5 5s. per ton d/d station or ex depot in 2-cwt. bags.

SODIUM ACETATE.—£21 to £22 per ton.

SODIUM BICARBONATE.—Refined spot £10 10s. per ton d/d station in bags. SCOTLAND: Refined recrystallised £10 10s. ex quay or station. MANCHESTER: £10 10s.

SODIUM BICHROMATE.—Crystals cake and powder 4d. per lb. net d/d U.K. discount according to quantity. Anhydrous 5d. per lb. LONDON: 4d. per lb. with discounts for quantities. SCOTLAND: 4d. delivered buyer's premises with concession for contracts. MANCHESTER: 4d. less 1 to 3½% contracts, 4d. spot lots.

SODIUM BISULPHITE POWDER.—60/62%, £16 10s. per ton d/d 1-cwt. iron drums for home trade.

SODIUM CARBONATE (SODA CRYSTALS).—SCOTLAND: £5 to £5 5s. per ton ex quay or station. Powdered or pea quality 7s. 6d. per ton extra. Light Soda Ash £7 ex quay, min. 4-ton lots with reductions for contracts.

SODIUM CHLORATE.—2¾d. per lb. LONDON: £29 per ton. MANCHESTER: £28 to £29.

SODIUM CHROMATE.—3⅝d. per lb. d/d U.K.

SODIUM HYPOSULPHITE.—SCOTLAND: Large crystals English manufacture £9 5s. per ton ex stations, min. 4-ton lots. Pea crystals £15 ex station 4-ton lots. MANCHESTER: Commercial, £9 5s.; photographic, £15.
SODIUM NITRITE.—Spot £19 to £22 per ton d/d station in drums.
SODIUM PERBORATE.—LONDON: 10d. per lb.
SODIUM PHOSPHATE.—£13 to £15 per ton.
SODIUM PRUSSIATE.—LONDON: 5d. to 5½d. per lb. SCOTLAND: 5d. to 5¾d. ex store. MANCHESTER: 5d. to 6d.
SODIUM SILICATE.—140° Tw. Spot £8 5s. per ton d/d station returnable drums.
SODIUM SULPHATE (GLAUBER SALTS).—£4 2s. 6d. per ton d/d. SCOTLAND: English material £3 15s.
SODIUM SULPHATE (SALT CAKE).—Unground Spot £3 15s. per ton d/d station in bulk. SCOTLAND: Ground quality, £3 5s. per ton d/d. MANCHESTER: £3 2s. 6d.
SODIUM SULPHIDE.—Solid 60/62% Spot £10 15s. per ton d/d in drums. Crystals Spot £7 15s. per ton d/d in casks. SCOTLAND: For home consumption, Solid 60/62%, £10 5s.; broken 60/62%, £11 5s.; crystals, 30/32%, £8 2s. 6d. d/d buyer's works on contract, min. 4-ton lots. Spot solid 5s. per ton extra. Crystals, 2s. 6d. per ton extra. MANCHESTER: Concentrated solid, 60/62%, £11; commercial, £8.
SODIUM SULPHITE.—Pea crystals spot, £13 10s. per ton d/d station in kegs. Commercial spot £9 10s. d/d station in bags.
SULPHATE OF COPPER.—MANCHESTER: £15 10s. per ton f.o.b.
SULPHUR.—£12 5s. per ton. SCOTLAND: Flowers, £12 10s.; roll, £12; rock, £9. Ground American, £12 ex store.
SULPHUR CHLORIDE.—5d. to 7d. per lb., according to quality.
SULPHUR PRECIP.—B.P. £55 to £60 per ton according to quantity. Commercial, £50 to £55.
VERMILION.—Pale or deep, 5s. to 5s. 3d. per lb.
ZINC CHLORIDE.—SCOTLAND: British material, 98%, £18 10s. per ton f.o.b. U.K. ports.
ZINC SULPHATE.—LONDON and SCOTLAND: £12 per ton.
ZINC SULPHIDE.—1s. to 1s. 2d. per lb.

Pharmaceutical and Fine Chemicals

ACID, CITRIC.—1s. 0¾d. per lb.
ACID, PYROGALLIC, CRYST.—7s. 3d. per lb. for 28-lb. lots. Resublimed: 8s. 6d. per lb. for 28-lb. lots, d/d.
ACID, SALICYLIC.—B.P. pulv., 1s. 5d. to 1s. 8d. per lb. Technical, 1s. to 1s. 2d. per lb.
ACID, TANNIC, B.P.—3s. 2d. to 3s. 6d. per lb.
ACID, TARTARIC.—1s. per lb.
ASPIRIN.—2s. 7d. to 3s. per lb., including packing and delivery.
IODINE, RESUB., B.P.—20s. 8d. to 26s. per lb.
IODOFORM B.P.—23s. 9d. to 29s. 3d. per lb.
LITHIUM CARBONATE.—5s. 3d. to 5s. 6d. per lb.
LITHIUM CHLORIDE, CRYST.—8s. 3d. per lb.
LITHIUM CITRATE.—5s. 3d. per lb. Powder, 5s. 6d. per lb.
METHYL SALICYLATE.—1s. 4½d. to 1s. 6½d. per lb., including bulk packing and delivery.
POTASSIUM IODIDE, B.P.—17s. 10d. to 21s. 7d. per lb.
QUININE SULPHATE.—2s. 4d. per oz.
SODIUM IODIDE.—19s. 4d. to 23s. 9d. per lb.
SODIUM SALICYLATE.—Powder, 1s. 10d. to 2s. 5d., including packing and delivery; Crystal, 1d. per lb. more.
SACCHARIN.—37s. 6d. per lb. delivery free, packing inclusive, duty paid, subject to usual scale of rebates.
VANILLIN.—Ex clove oil, 16s. to 18s. per lb.; ex Guaiacol, 14s. 3d. to 16s. 3d. per lb., including packing and delivery free U.K.

Intermediates and Dyes

IN the following list of Intermediates delivered prices include packages except where otherwise stated:—

ACID, BENZOIC, B.P. (ex Toluol).—1s. 9½d. per lb.
ACID, GAMMA.—Spot, 4s. per lb. 100% d/d buyer's works.
ACID H.—Spot, 2s. 4½d. per lb. 100% d/d buyer's works.
ACID, NEVILLE AND WINTHER.—Spot, 3s. per lb. 100% d/d buyer's works.
ACID, SULPHANILIC.—Spot, 8d. per lb. 100% d/d buyer's works.
ANILINE OIL.—Spot, 8d. per lb., drums extra, d/d buyer's works.
ANILINE SALTS.—Spot, 8d. per lb. d/d buyer's works, casks free.
BENZALDEHYDE.—Spot, 1s. 8d. per lb., packages extra.
BENZIDINE BASE.—Spot, 2s. 5d. per lb. 100% d/d buyer's works.
o-CRESOL 30/31° C.—£2 6s. 5d. per cwt., in 1-ton lots.
m-CRESOL 98/100%.—2s. 9d. per lb., in ton lots.
p-CRESOL.—34.5° C.—1s. 9d. per lb., in ton lots.
DICHLORANILINE.—2s. per lb.
DIMETHYLANILINE.—Spot, 1s. 6d. per lb., package extra.
DINITROBENZENE.—8½d. per lb.
DINITROTOLUENE.—48/50° C., 8½d. per lb.; 66/68° C., 9d. per lb.
DIPHENYLAMINE.—Spot, 2s. per lb., d/d buyer's works.
α-NAPHTHOL.—Spot, 2s. 4d. per lb., d/d buyer's works.
β-NAPHTHOL.—Spot, £75 per ton in 1-ton lots, d/d buyer's works.
α-NAPHTHYLAMINE.—Spot, 11½d. per lb., d/d buyer's works.
β-NAPHTHYLAMINE.—Spot, 2s. 9d. per lb. d/d buyer's works.
o-NITRANILINE.—5s. 10d. per lb.
m-NITRANILINE.—Spot, 2s. 7d. per lb. d/d buyer's works.
p-NITRANILINE.—Spot, 1s. 8d. per lb. d/d buyer's works.
NITROBENZENE.—Spot, 5d. per lb.; 5-cwt. lots, drums extra.
NITRONAPHTHALENE.—9d. per lb.
SODIUM NAPHTHIONATE.—Spot, 1s. 9d. per lb.
o-TOLUIDINE.—Spot, 9½d. per lb., drums extra, d/d buyer's works.
p-TOLUIDINE.—Spot, 1s. 11d. per lb., d/d buyer's works.
m-XYLIDINE ACETATE.—3s. 6d. per lb., 100%.

Coal Tar Products

ACID, CARBOLIC (CRYSTALS).—5½d. to 6¾d. per lb. Crude, 60's 1s. 5¼d. to 1s. 6¼d. per gal. SCOTLAND: Sixties, 1s. 7d. to 1s. 8d.
ACID, CRESYLIC.—99/100, 1s. 7d. per gal.; B.P., 2s. to 2s. 2d.; Refined, 1s. 9d. to 1s. 11d.; Pale, 98%, 1s. 0d. to 1s. 7d.; Dark, 1s. 4d. to 1s. 4½d. LONDON: 98/100%, 1s. 6d. Dark 95/97%, 1s. 4d. SCOTLAND: Pale 99/100%, 1s. 3d. to 1s. 4d.; 97/99%, 1s. to 1s. 1d.; dark 97/99%, 11d. to 1s.; high boiling acid, 2s. 0d. to 3s.
BENZOL.—At works, crude, 8½d. to 9d. per gal. Standard motor, 1s. 3½d. to 1s. 4d.; 90%, 1s. 4d. to 1s. 5d. Pure, 1s. 7d. to to 1s. 8d. LONDON: Motor, 1s. 5½d. SCOTLAND: Motors, 1s. 3½d. to 1s. 4½d.; 90%, 1s. 9½d. to 1s. 10½d.
CREOSOTE.—Standard for export, 4¾d. to 5d. nett per gal. f.o.b. for Home, 3¾d. d/d. LONDON: 3d. to 3½d. f.o.r. North; 4d. to 4½d. London. MANCHESTER: 3d. to 4d. SCOTLAND: Specification oils, 3¾d. to 4¼d.; washed oil, 4d. to 4½d.; light, 3¾d. to 4¼d.; heavy, 4½d. to 5d.
NAPHTHA.—Solvent, 90/160, 1s. 4d. to 1s. 5d. per gal.; 95/160, 1s. 4½d.; 90/190, 1s. 1d. to 1s. 2d. LONDON: Solvent, 1s. 1½d. to 1s. 2d.; heavy, 11d. to 1s. 0¼d. f.o.r. SCOTLAND: 90/160, 1s. 3d. to 1s. 3½d.; 90/190, 1s. 1d. to 1s. 2d.
NAPHTHALENE.—Purified crystals, £9 10s. per ton in bags. LONDON: Fire lighter quality, £3 to £3 10s.; 74/76 quality, £4 to £4 10s.; 76/78 quality, £5 10s. to £6. SCOTLAND: 40s. to 50s.; whizzed, 65s. to 70s.
PYRIDINE.—90/140, 3s. 9d. per gal.; 90/160, 4s. to 4s. 6d.; 90/180, 2s. to 2s. 6d. SCOTLAND: 90/160%, 4s. to 5s.; 90/220%, 3s. to 4s.
REFINED COAL TAR.—SCOTLAND: 4¾d. to 5d. per gal.
TOLUOL.—90%, 2s. 1d. to 2s. 2d. per gal.; Pure, 2s. 5d. to 2s. 6d.
XYLOL.—1s. 9d. per gal.; Pure, 1s. 11d.

Wood Distillation Products

ACETATE OF LIME.—Brown, £8 per ton. Grey, £11 10s. to £12. Liquor, brown, 30° Tw., 6d. per gal. MANCHESTER: Brown, £8; grey, £11 10s.
ACETIC ACID, TECHNICAL, 40%.—£16 15s. to £18 per ton.
ACETONE.—£63 to £65 per ton.
AMYL ACETATE, TECHNICAL.—95s. to 110s. per cwt.
CHARCOAL.—£7 10s. to £12 per ton.
IRON LIQUOR.—24°/30° Tw., 10d. to 1s. 2d. per gal.
WOOD CREOSOTE.—1s. to 2s. 6d. per gal., unrefined.
WOOD NAPHTHA, MISCIBLE.—3s. to 4s. per gal. Solvent, 3s. 9d. to 4s. 9d. per gal.
WOOD TAR.—£2 to £6 per ton.
BROWN SUGAR OF LEAD.—£32 per ton.

Nitrogen Fertilisers

SULPHATE OF AMMONIA.—During the week the export market has displayed a firmer tendency, and the price is now £4 7s. 6d. per ton f.o.b. U.K. port in single bags, for prompt shipment. In the home market large sales have been recorded at the price of £5 5s. per ton delivered in 6-ton lots to farmers' nearest station.
IMPORTED NITRATE OF SODA.—Last season's price of £9 per ton delivered in 6-ton lots to farmers' nearest station remains unchanged.
BRITISH NITRATE OF SODA.—Last season's price of £8 16s. per ton delivered in 6-ton lots to farmers' station remains unchanged.
NITRO-CHALK.—The price remains unchanged at £7 5s. per ton delivered in 6-ton lots.

Latest Oil Prices

LONDON, August 3.—LINSEED OIL was slow. Spot, small quantities, £16; Aug., £12 17s. 6d.; Sept.-Dec., £13 7s. 6d.; Jan.-April, £14 5s.; May-Aug., £14 17s. 6d. per ton, naked. RAPE OIL was slow. Crude extracted, £28; technical refined, £30 per ton, naked, ex wharf. COTTON OIL was steady. Egyptian crude, £22; refined common edible, £25; and deodorised, £27 per ton, naked, ex mill. TURPENTINE was easy. American, spot, 59s. 9d. per cwt.
HULL.—LINSEED OIL.—Spot, £13; Aug., £12 12s. 6d.; Sept.-Dec., £13; Jan.-April, £13 12s 6d. per ton. COTTON OIL.—Egyptian crude, spot, £22 5s.; edible refined, spot, £24; technical spot, £24; deodorised, £25 15s. per ton, naked. PALM KERNEL OIL.—Crude, f.m.q. spot, £22 10s. per ton, naked. GROUNDNUT OIL.—Crushed/extracted, spot, £32; deodorised, £36 per ton. RAPE OIL.—Crushed/extracted, spot, £27 10s.; refined, £29 per ton. SOYA OIL.—Crushed/extracted, spot, £20 10s.; deodorised, £23 10s. per ton. COD OIL.—15s. per cwt. CASTOR OIL.—Pharmacy, spot, 41s. 6d.; first, 36s. 6d.; second, 31s. 6d. per cwt. TURPENTINE.—American, spot, 62s. per cwt.

British Tintex and Dye Products

Reduction of Capital

IN the Chancery Division on July 29, Mr. Justice Eve had before him a petition by the British Tintex and Dye Products, Ltd., to confirm a reduction of capital from £200,000 to £42,750 15s.

Mr. L. GLUCKSTEIN said the reduction was due to substantial losses. The company was incorporated in 1928 and unfortunately at the beginning it paid a large sum for trade marks and licences for the particular processes which it was going to exploit, and that, taken in conjunction with the floatation expenses, was responsible for the position the company was now in. The losses were incurred by the original board of directors, none of whom were now in the company. They were writing off nine-tenths of the issued capital and the five shilling shares would be written down to sixpence.

His lordship sanctioned the scheme.

Letters to the Editor

War Loan Conversion and Income Tax

SIR,—Possibly a large number of your readers will be experiencing some doubt as to the Income Tax position with regard to the interest on the present 5 per cent. war loan which is being converted into a 3½ per cent. investment. On the normal basis of assessment on the preceding year's results, the assessment for 1933-34 would obviously be greater than the actual income arising from the security in that year.

Questions and answers in the House of Commons make it clear that it is proposed to treat the 3½ per cent. loan as a new investment, which will mean that for 1933-34 the assessment should be based upon the actual interest of that year. To holders of large amounts this will mean a considerable reduction in the amount payable.—Yours faithfully,

W. R. FAIRBROTHER.

Bush House, Aldwych, W.C.2.

Inventions in the Chemical Industry

Specifications Accepted and Applications for Patents

THE following information is prepared from the Official Patents Journal. Printed copies of Specifications Accepted may be obtained from the Patent Office, 25 Southampton Buildings, London, W.C.2, at 1s. each. The numbers given under "Applications for Patents" are for reference in all correspondence up to the acceptance of the Complete Specification.

Timber-Proofing Preparations

COPPER-containing water emulsions suitable for proofing timber fabric and other materials against fungi, dry rot, termites, etc., are prepared by dispersing in water with the aid of turkey red oil or other emulsifying agent, a solution of a substantially water-insoluble copper salt of a higher fatty acid in an organic solvent which is slightly or completely soluble in water. Copper oleate or other copper salts of saturated or unsaturated fatty acids may be used. The organic solvents employed include alcohols such as butyl or amyl alcohol, ketones such as diacetone aicohol, and esters such as butyl lactate or amyl acetate. With solvents, such as butyl alcohol, more soluble in water, a salting-out agent such as sodium chloride or sulphate may be employed to decrease their solubility. (See Specification No. 367,913, of J. V. Eyre, H. Longwell, and the Distillers Co., Ltd.)

Protective Coatings for Metals

PROTECTIVE coatings are applied to metallic articles by dissolving or suspending an induratable artificial resin in tar oil together with inorganic fillers, such as heavy spar or quartzite, the solution or suspension being applied to the hot article by dipping, brushing or spraying. The boiling point range of the tar oil is so selected as to coincide with that at which the resin passes into the insoluble and infusible condition. Other organic materials of high boiling point, such as anthracene oil boiling above 300° C., may be added and the resin may be used in the powdered, liquid or semi-liquid condition. In an example, a metal tube, heated to 260-280° C. during the operation, is brushed or sprayed with a suspension of a finely powdered cresolformaldehyde resin in tar oil boiling between 210-240° C., an equal amount of finely powdered quartzite being included. (See Specification No. 368,538 of Vereinigte Stahlwerke Akt.-Ges.)

Artificial Sponge

ARTIFICIAL sponges are made from a mixture of viscose and soluble salts, if required with an addition of fibrous material, *e.g.*, hemp, using as a coagulating agent a hot, preferably boiling, solution of a salt. The salt in the coagulating solution is preferably one which reacts with caustic soda solution; suitable salts are, *e.g.*, sodium sulphate, magnesium sulphate, magnesium chloride, sodium sulphite or mixtures thereof or salts of volatile bases which are expelled by a hot caustic soda solution, *e.g.*, ammonium or aniline sulphate. Acids, such as sulphuric, hydrochloric, sulphurous, boric, glycollic, and lactic acids, may also be added to the salt solutions. The pore-forming salt may be any salt soluble in the salt solution used and is preferably a salt containing a considerable amount of water of crystallisation, *e.g.*, $Na_2SO_3.7H_2O$ or $Na_2SO_4.10H_2O$. (See Specification No. 369,082, of I. G. Farbenindustrie.)

Activated Carbon

CARBON contained in the light ashes formed and carried into the flue during the combustion of brown coal (lignite), ordinary coal, wood or peat is activated by heating with alkali carbonates at a temperature of 1,000-1,050° C. in the presence, if desired, of air, water vapour, oxygen, or inert gases. Alternatively, the activation is effected without the addition of chemicals by heating to the above temperatures. To minimise heat losses, the ashes may be activated immediately after withdrawal from the flue. After activation, the product is worked up in known manner by washing with water, then with acid and again with water, after which it is dried and ground. (See Specification No. 365,685, of W. W. Groves, a communication from Akt.-Ges. für Stickstoffdünger.)

Purifying Hydrocarbon Oils

HYDROCARBON oils are purified by treating the preferably dry liquid or vapour with ozonised air, washing with alkali, and redistilling. Treatment with catalytic, contact, or condensing agents polymerising gum-forming constituents may accompany or follow the treatment with ozonised air, and the oil may be filtered before the alkali wash. The ozonised air may be blown or otherwise passed through the oil, if desired under reduced pressure, or the oil may be sprayed into ozonised air. Catalysts specified are sulphuric acid, chlorides or sulphates of heavy metals, *e.g.*, zinc chloride, iron chloride, sulphate, or persulphate, tin chloride, and copper sulphate, a mixture of iron chloride or sulphate or other heavy metal salt with diluted sulphuric acid, fuller's earth, floridin, and bauxite. Sodium hydrate or carbonate, and calcium hydrate are specified alkalis. See Specification No. 367,848, of M. Stuart and L. M. Stuart.)

Albumens from Peanuts

THE residue from the filtration of crude pressed peanut oil is mixed with caustic alkali solution and boiled with alkali chloride solution, the oil layer is removed, the solid residue separated, and the remaining liquid treated with acid to precipitate casein; after filtering, an inferior albuminous matter is precipitated by "alumino-ferric" or the like; the remaining solution may be used for treating subsequent batches of material or for the recovery of salts. In an example, the filtration residue is mechanically mixed with caustic soda solution and allowed to react for 30 minutes; the mass is then boiled with sodium chloride solution for 30 minutes and allowed to settle; the oil is skimmed off, and the aqueous solution withdrawn. The solution is centrifuged to remove traces of oil, and filtered to remove precipitated casein; the filtrate is then treated with a crude mixture of sulphate of iron and aluminium to precipitate the remaining albuminous matter. The casein is washed with water and then dried at 120° C. (See Specification No. 366,969, of A. F. Yuill and S. R. Bhate.)

Dewaxing Oils

IN the separation or purification of wax and the production of oils of low pour point by treatment of the raw material with a mixture of a poor solvent and of a good solvent for wax, followed by filtration, the filtrate is distilled to recover at least a portion of the poor solvent, and the recovered poor solvent is used to purify the wax cake, *e.g.*, by washing or by dissolving and chilling. Good solvents specified are benzol, naphtha, carbon tetrachloride, toluene, and xylene; poor solvents are acetone, ethyl, isopropyl, and butyl alcohols, ethylene dichloride, and propylene dichloride. In an example, 80 lb. of wax distillate is treated with 36 lb. of benzol and 84 lb. of ethylene dichloride, and the mixture chilled to −20° F. and filtered. The filtrate is stripped to obtain the solvents and an oil having a cold test of −20-30° F. The wax cake is dissolved in 60 lb. of the recovered dichloride, chilled to 15° C., and filtered, the cake being washed with the remaining dichloride and then heated to remove residual solvent. (See Specification No. 370,325 of The Gulf Refining Co.)

Purified Caustic Soda

IN the production of caustic soda with a low sodium chloride content, a 50 per cent. solution of caustic soda obtained by concentration is cooled to about 18 to 20° C. and freed from solid sodium chloride, whereupon the remaining solution is cooled to a temperature not exceeding about 10° C., crystals of hydrated sodium hydroxide separating out, while the sodium chloride remains dissolved in the supersaturated solution. After the separation of the hydrated sodium hydroxide crystals, the mother liquor is mixed with fresh 50 per cent. caustic soda solution and after the separation of further solid sodium chloride, the process is repeated. The cooling should preferably be slow and may take place in a tubular cooler containing a worm conveyor. The cooling may, however, be carried out discontinuously in separate stages for example 20 to 17° C. in a first stage, 17 to 14° C. in a second and 14 to 10° C. in a third, separating the solid hydrate formed at each stage. Preferably only up to one-half of the caustic soda content of the liquor is separated as solid hydrate. (See Specification No. 366,414, of A. L. Mond, a communication from I. G. Farbenindustrie.)

Specifications Accepted with Date of Application

PROCESSES FOR HARDENING ALLOY STEEL. W. H. Hatfield and H. Green. Feb. 25, 1931. 377,244.

PROCESS FOR ACCELERATING CHEMICAL REACTION BETWEEN TWO OR MORE GASES. Metallges A.-G. Mar. 29, 1930. 377,189.

MANUFACTURE AND PRODUCTION OF WETTING, CLEANSING AND EMULSIFYING AGENTS. J. Y. Johnson (*I. G. Farbenindustrie*). Mar. 19, 1931. 377,249.

MANUFACTURE OF INSOLUBLE AZO-DYESTUFFS ON THE FIBRE. W. W. Groves (*I. G. Farbenindustrie*). Mar. 19, 1931. 377,207.

SULPHUR-CONTAINING COMPOUNDS AND THEIR APPLICATION AS VULCANISATION ACCELERATORS FOR RUBBER AND RUBBER-LIKE SUBSTANCES. Imperial Chemical Industries, Ltd., R. Robinson, H. M. Bunbury, J. S. H. Davies, and W. J. Smith. Mar. 23, 1931. 377,253.

MANUFACTURE OF THERAPEUTICALLY-ACTIVE COMPOUNDS. W. W. Groves (*I. G. Farbenindustrie*). Apr. 14, 1931. 377,255.

MANUFACTURE OF PRODUCTS USEFUL AS WETTING AGENTS, DISPERSING AGENTS, EMULSIFYING AGENTS, AND WASHING AGENTS. W. W. Groves (*I. G. Farbenindustrie*). Apr. 15, 1931. 377,258.

PROCESS AND APPARATUS FOR THE MANUFACTURE OF CARBON. General Carbonalpha Co. Apr. 16, 1930. 377,259.

PROCESS FOR CONCENTRATING METALS. Trent Process Corporation. Apr. 17, 1930. 377,260.

SEPARATION OF UNSATURATED HYDROCARBONS FROM GAS MIXTURES CONTAINING THE SAME. J. Y. Johnson (*I. G. Farbenindustrie*).(Apr. 16, 1931. 377,193.

METHOD FOR THE MANUFACTURE OF PLASTIC MATERIALS. Deutsche Gasgluhlicht-Auer-Ges. Apr. 17, 1930. 377,265.

PROCESS FOR ACCELERATING THE THOROUGH HARDENING OF MASSES MADE OF CASEIN AND OTHER PROTEIN SUBSTANCES. Internationale Galalith-Ges. Hoff and Co. Sept. 8, 1930. 377,205.

MANUFACTURE OF AZO-DYESTUFFS ON THE FIBRE. W. W. Groves (*Soc. of Chemical Industry in Basle*). Apr. 21, 1931. 377,271.

METHOD OF LESSENING THE CORROSIVE ACTION OF SEA-WATER UPON IRON OR STEEL TANKS OR RECEPTACLES USED FOR THE TRANSPORT OR STORAGE OF OILS AND OTHER FLUIDS. W. E. Lewis. Apr. 22, 1931. 377,226.

MANUFACTURE OF UREAS. A. Carpmael (*I. G. Farbenindustrie*). Apr. 22, 1931. 377,278.

MANUFACTURE OF AZO-DYESTUFFS. A. Carpmael (*I. G. Farbenindustrie*). Apr. 25, 1931. 377,299.

REMOVAL OF AMMONIA AND HYDROGEN SULPHIDE FROM GASES. I. G. Farbenindustrie and F. Overdick. Apr. 25, 1931. 377,300.

MANUFACTURE OF ORGANIC ESTERS OF CELLULOSE. British Celanese, Ltd. Apr. 29, 1930. 377,313.

PRODUCTION OF HIGHLY-SOLUBLE BASIC SLAG. A. Sullwald. May 7, 1931. 377,328.

SEPARATION OF IMPURITIES FROM VEGETABLE AND ANIMAL FATTY OILS. J. Y. Johnson (*I. G. Farbenindustrie*). May 11, 1931. 377,336.

METHODS OF AND APPARATUS FOR CRYSTALLISATION. Dorr Co. May 10, 1930. 377,337.

PRODUCING COMPOUNDS OF LEAD. P. Gamichon. June 19, 1930. 377,381.

TREATMENT OF SURFACE OF ALUMINIUM OR ALUMINIUM ALLOYS. Vereinigte Aluminium-Werke A.-G. Feb. 2, 1931. 377,385.

PROCESS FOR THE PREPARATION OF CONDENSATION PRODUCTS OF THE ANTHRAQUINONE SERIES. Chemische Fabrik Vorm. Sandoz. July 18, 1930. 377,419.

APPARATUS FOR EXTRACTING OIL FROM SHALE AND OTHER MINERAL SUBSTANCES. W. S. Cripps and J. Stormonth. Sept. 15, 1930. 377,435.

PROCESS FOR TREATING THE CARBONACEOUS RESIDUES DERIVED FROM METAL-VOLATILISING PROCESSES IN ROTARY-DRUM FURNACES. Metallges Akt.-Ges. Aug. 13, 1930. 377,451.

PROCESS FOR OBTAINING LIGHT HYDROCARBONS FROM HEAVY CYCLIC HYDROCARBONS OR THEIR DERIVATIVES BY DESTRUCTIVE HYDROGENATION. A. J. Kling and J. M. F. D. Florentin. Sept. 1, 1930. 377,452.

MANUFACTURE OF SUBSTITUTED AROMATIC KETONES. Society of Chemical Industry in Basle. Aug. 28, 1930. 377,464.

PURIFICATION OF HYDROCARBONS. Compagnie Technique des Petroles. Sept. 23, 1930. 377,480.

PROCESS FOR THE PRODUCTION OF SULPHATES. Metallges A.-G. Jan. 20, 1931. 377,504.

PROCESS FOR CRACKING HYDROCARBONS. Gasoline Products Co., Inc. Oct. 21, 1930. 377,510.

SAPONIFICATION OF SPERMACETI AND SPERMACETI OIL. F. B. Dehn (*Deutsche Hydrierwerke A.-G.*). Nov. 13, 1931. 377,536.

PROCESS OF MAKING REACTION PRODUCTS OF KETONE. H. E. Potts (*Carbine and Carbon Chemicals Corporation*). Jan. 27, 1932. 377,574.

METHOD OF MAKING CHLORHYDRINS. H. Tropsch and R. Kassler. Feb. 18, 1931. 377,595.

MANUFACTURE OF ALKALI ALCOHOLATES. Dr. A. Wacker Ges. für Elektro-Chemische Industrie Ges. June 24, 1931. 377,631.

PREPARATION OF CONDENSATION PRODUCTS OF THE ANTHRAQUINONE SERIES. Chemische Fabrik Vorm. Sandoz. Apr. 29, 1931. 377,632.

Applications for Patents

MANUFACTURE OF DYES, ETC. I. B. Anderson, Imperial Chemical Industries, Ltd., D. C. R. Jones, and R. F. Thomson. July 19. 20439.

TANKS OR VATS. J. de Blicquy and C. Callebaut. July 21. 20561.

DYE VATS. J. de Blicquy and C. Callebaut. July 22. 20672.

PRODUCTION OF BENZOIC ACID, ETC. Bozel-Malétra Soc. Industrielle de Produits Chimiques. July 20. (Germany, June 23). 20547, 20548.

DYEING. F. Farrington, Hardcastle and Co., Ltd., and C. L. Wall. July 20. 20473.

REMOVING IMPURITIES FROM OILS AND FATS. A. Freiburg. July 19. 20447.

FUNGICIDES. Grasselli Chemical Co. July 19. (Oct. 1, '31.) (United States, Oct. 1, '30.) 20440.

MANUFACTURE OF THERAPEUTICALLY-ACTIVE COMPOUNDS. W. W. Groves (*I. G. Farbenindustrie*). July 19. 20456.

PRODUCTION OF NICKEL CARBONYL. J. Y. Johnson (*I. G. Farbenindustrie*). July 18. 20283.

CONVERSION OF HYDROCARBONS. J. Y. Johnson (*I. G. Farbenindustrie*). July 20. 20511.

MANUFACTURE OF VINYL ESTERS. J. Y. Johnson (*I. G. Farbenindustrie*). July 20. 20512.

MANUFACTURE OF WATER-INSOLUBLE DYESTUFFS. I. G. Farbenindustrie. July 18. (Germany, July 22, '31.) 20292.

MANUFACTURE OF 1-AMINO-10-ANTHRONES AND 1-AMINO-ANTHRAQUINONE COMPOUNDS. I. G. Farbenindustrie. July 18. (Germany, July 17, '31.) 20334.

MANUFACTURE OF OIL-SOLUBLE SYNTHETIC RESINS. I. G. Farbenindustrie. July 20. (Germany, July 20, '31.) 20526.

MANUFACTURE OF MONO-N-ALKANOL DERIVATIVES OF AROMATIC DIAMINES AND POLYAMINES. I. G. Farbenindustrie. July 21. (Germany, Oct. 15, '31.) 20630.

MANUFACTURE OF STABLE SALTS OF DIALKYLAMINO-ARYL-PHOSPHINOUS ACIDS. I. G. Farbenindustrie. July 23. (Germany, July 24, '31.) 20845.

INCREASING VISCOSITY OF MINERAL OILS, ETC. Imperial Chemical Industries, Ltd. July 22. 20749.

TREATMENT OF CRUDE PHOSPHATES. Norsk Hydro-Elektrisk Kvaelstofaktieselskab. July 23. (Norway, Aug. 20, '31.) 20830.

MANUFACTURE OF COMPLEX COMPOUNDS OF THIO-SUBSTITUTED CARBOHYDRATES. Schering-Kahlbaum A.-G. July 18. (Germany, Aug. 3, '31.) 20203.

From Week to Week

A LARGE QUANTITY OF HOT TAR escaped at Sandilands Chemical Works, Aberdeen, last week as the result of a pipe bursting.

TRADE IS REPORTED TO BE BETTER at the four works of the United Turkey Red Co., at Vale of Leven.

RECENT WILLS include:— Edwin James Shaw, of The Elms, Comberbach, near Northwich, Cheshire, engineer of Imperial Chemical Industries, £11,125 (net personalty, £8,457).

THE BRITISH SILK DYEING CO.'S works at Balloch, Dumbartonshire, which have been closed down for some time are to re-open in October. Meantime extensive alterations are being made to both the building and plant.

THE DIRECTORS OF KODAK, LTD., have purchased £100,000 of 5 per cent. War Loan solely for the purpose of conversion; Unilever, Ltd., has converted £1,250,000, and the British Oxygen Co., Ltd., has purchased £100,000 for conversion.

THE GOVERNMENT of the Dutch East Indies proposes to make a grant of 25,000 guilders (approximately £2,080) yearly for three years to the research committee of the American Gum Importers' Association with a view to methodical research being made into the use of gums and resins produced in the Dutch East Indies.

A HANDSOME BROCHURE, describing the University College, Nottingham, has been issued to those members of the Society of Chemical Industry who visited the College on the occasion of the Society's fifty-first annual meeting last month. The brochure gives full particulars of the valuable work carried on at the College in the interests of chemical education.

RECORD APPLICATIONS FOR SPACE at next February's British Industries Fair are announced by the Department of Overseas Trade. Seven hundred and five exhibitors have applied for 270,674 square feet at Olympia and the Court of Honour at the White City. The figure is an increase of 60,000 ft., compared with the corresponding period a year ago. One hundred and twenty-seven exhibitors have applied for 74,134 square feet of space in the textile section at the White City, and Birmingham reports that 90 per cent. of the available space at Castle Bromwich is now let.

AN INFORMAL LUNCHEON to meet some of the leading American industrialists was given to Dr. E. F. Armstrong and Mr. J. Davidson Pratt, of the Association of British Chemical Manufacturers, by Mr. W. Haynes, publisher of "Chemical Markets" at New York on July 15. Those present included Messrs. Horace Bowker, president of the American Agricultural Chemical Co.; Eli Winkler, executive vice-president of the Columbia Alkali Co.; George W. Merck, president of Merck and Co., Inc.; E. M. Allen, president of the Mathieson Alkali Works, Inc.; William S. Gray, president of Wm. S. Gray and Co.; William B. Thom, president of Westvaco Chlorine Products; H. F. Atherton, secretary of the National Aniline and Chemical Co., Inc.; and Robt. H. de Greeff, president of R. W. Greeff and Co., Inc

A DECREE WILL PROBABLY BE SIGNED in the near future by the President of Chile authorising a Bolivian oil company to construct a pipe-line through Chilean territory. The line will run from Santa Cruz in the north and Yacuiba (Argentina) in the south, traversing 120 miles of Chilean territory, as far as Antofagasta or Iquique. The cost of construction is estimated at £15,000,000, and the concessionaires will have to deposit this sum as a guarantee before commencing work. The concessionaires, in addition, will undertake to transport by this new line all the petrol necessary to Chile at a tariff rate to be fixed later by the Government, and will undertake to supply the Chilean Petrol Monopoly with petrol at 10 per cent. below the current market prices. The work will give employment to 10,000 Chileans.

JOHN EDWARD LENNARD-JONES, Ph.D., Sc.D., professor of theoretical physics in the University of Bristol, has been elected to the John Humphrey Plummer Professorship of Inorganic Chemistry at Cambridge University as from next October.

MR. GEORGE HORNER, of Burnley, who has secured the degree of M.Sc. at the early age of 21, has been appointed assistant chemist at the British Fruit Canning Research Station at Chipping Campden, Gloucestershire.

THE SHEREEFIAN PHOSPHATE CO., Morocco, is to issue 25,000 debentures of 1,000f. each, to bear interest at the rate of 5 per cent. per annum. Both principal and interest are guaranteed by the Shereefian Government.

THE BRITISH BURMAH OIL CO. has decided to take over the torbanite fields between Wakkerstroom and Pietretief (South Africa). Deposits totalling millions of tons have been proved by various syndicates. It is understood that the work of the British Research Board enabled the company to exercise the options.

BRITANNIA IS SHOWN AS AN AMAZON in the new British Industries Fair poster by Mr. Tom Purvis, 70,000 copies of which are in process of being printed for display throughout the civilised world. The poster shows Britannia with upraised forearm silhouetted in white against a deep blue background with "B.I.F. 1933" in solid lettering of bright red. The Fair's opening date (February 20) is being added in eight languages for the versions used abroad.

THE COMMISSIONERS OF CUSTOMS AND EXCISE are advised that imported molasses when delivered (a) to a licensed distiller for use in the manufacture of spirits or yeast or to a person for use in the manufacture of yeast in premises used solely for that purpose; or (b) solely for the purpose of food for stock, and exempted from sugar duty under the provisions of Section 4 and Parts I and III 2, of the Second Schedule to the Finance Act, 1928, is liable to payment of a duty of Customs equal to 10 per cent. of the value of the goods under the provisions of Section 1 of the Import Duties Act, 1932. They therefore give notice that the charge of 10 per cent. *ad valorem* duty on imported molasses delivered for the purposes described above will be levied as from October 1, 1932.

THE INTERNATIONAL NITRATE CONFERENCE continued its discussions in private at Scheveningen, Holland, on August 2. An effort is being made to prevent a longer struggle between the producers of synthetic nitrates and the producers of natural nitrates, that is, the Chilean group. An agreement is reported to have been reached defining the production and export quota to be allotted to each group. It was reported on Wednesday that the British delegation was leaving for London that night, but other representatives were remaining for some days to draw up the text of the agreement. An official communiqué is being issued. It is understood that the apportionment of the world market between the two groups of producers has been the chief difficulty. Information from Santiago de Chile, dated July 31, is to the effect that a cable has been sent to Don Enrique Villegas, the Chilean Ambassador in London, authorising him to sign the agreement with the producers of synthetic nitrates.

Obituary

CHARLES JOHN ANDERSON, J.P., eldest son of the late Dr. Thomas Anderson, Professor of Chemistry at Glasgow University; in his 80th year.

MR THOMAS HENRY MASON, managing director and founder of the well-known North Country firm of Mason and Co., Ltd., chemists. Aged 75 years.

Books Received

THE CALCULATION OF HEAT TRANSMISSION. By Margaret Fishenden and Owen A. Saunders. London: H.M. Stationery Office. Pp. 280. 10s.

ADULTERATION AND ANALYSIS OF FOODS AND DRUGS. By J. F. Liverseege. London: J. and A. Churchill. Pp. 599. 36s.

EXPLOSIVES. By Arthur Marshall. Vol. III. London: J. and A. Churchill. Pp. 286. 42s.

New Companies Registered

Ockinga Chemical Works (England), Ltd., Bowlee Mill, Bowlee, near Middleton. Registered July 16. Nominal capital £1,000 in £1 shares. Manufacturers of and dealers in chemicals, soap, dyes, colours, glue, gelatine size, glycerine, etc. Directors: S. Eastwood, "Baildon," Broadway, Cheadle, Cheshire, and O. K. Okkinga.

Sulzer Bros. (London), Ltd., 31 Bedford Square, London, W.C.1. Registered as a "private" company on July 20. Nominal capital £50,000 in £1 shares. To acquire the business of engineers carried on in partnership by C. Sulzer, R. Sulzer, H. L. Wolfer, R. Matossi, F. Oederlin and O. Sulzer, as Sulzer Bros., at 31 Bedford Square, W.C.1, and certain assets (including goodwill), and to carry on the business of mechanical, electrical, civil, chemical, water, gas, heating, ventilating, refrigerating, general engineers and contractors, etc. Directors: H. Sulzer, Winterthur, Switzerland, R. Sulzer, H. L. Wolfer, F. Oederlin, J. F. Schnbeler and W. T. Batho.

New Chemical Trade Marks

Opposition to the registration of the following trade marks can be lodged up to August 27, 1932.

Neosyl. 525,887. Class 4. Silica partly prepared for use in manufactures. Peter Spence & Sons, Ltd., National Buildings, St. Mary's Parsonage, Manchester, chemical manufacturers. September 23, 1931.

Marvo. 530,808. Class 4. Raw, or partly prepared, vegetable, animal, and mineral substances used in manufactures, not included in other classes, but not including tanning substances and not including any goods of a like kind to tanning substances. The Walpamur Co., Ltd., Walpamur House, 35-36 Rathbone Place, Oxford Street, London, W.1, manufacturers. April 6, 1932.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

County Court Judgment

[NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.]

SMETHURST (HERBERT) (KNUTSFORD), LTD., Ollerton Works, Knutsford, engineers and chemical manufacturers. (C.C., 6/8/32.) £12 0s. 10d. June 14.

Companies Winding Up Voluntarily

CHEMICAL AND WOOD INDUSTRIES, LTD. (C.W.U.V. 6/8/32.) By special resolution, July 27. Alfred Ernest Jones, (a partner in the firm of Price, Waterhouse & Co.), of 3 Frederick's Place, Old Jewry, London, E.C., appointed liquidator. Creditors' claims to liquidator by September 5.

NON-INFLAMMABLE FILM CO., LTD. (C.W.U.V. 6/8/32.) Creditors' claims to the joint liquidators, Howard Button and James Gibson Harris, Africa House, Kingsway, London, W.C.2, by August 30.

Mortgages and Charges

NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.]

BONNAIRE, LTD., London, W., chemical manufacturers. (M. 6/8/32.) Registered July 21, debenture to Lloyds Bank, Ltd., securing all moneys due or to become due to the Bank; general charge. *£800. December 31, 1931.

CEMENT INDUSTRIES, LTD., London, S.W. (M. 6/8/32.) Registered July 20, £8,300 debentures, part of amount already registered; general charge.

Chemical Trade Inquiries

Abstracted from the "Board of Trade Journal." Names and addresses may be obtained from the Department of Overseas Trade (Development and Intelligence), 35 Old Queen Street, London, S.W.1 (quote reference number).

Jamaica. A commission agent in Kingston, Jamaica, is desirous of obtaining United Kingdom agencies for glass bottles (1 oz., 2 oz., 4 oz., and 6 oz.) for toilet preparations and other special moulds and drugs and patent medicines for the island of Jamaica. (Ref. No. 140.)

Poland.—An agent in Warsaw desires to obtain the representation of United Kingdom manufacturers or exporters of dyes and chemicals for the textile industry. (Ref. No. 151.)

Persia.—The Persian Railways are calling for tenders, for the supply of water softening plant, steel tank, etc. (Ref. G.X. 11697.)

Persia.—The Persian Railways are calling for tenders, to be presented in Tehran for the supply of ice-making plant. (Ref. A.X. 11437.)

Other Inquiries

Replies to the following should be addressed to the Editor of THE CHEMICAL AGE.

Filters.—An inquirer wishes to get in touch with the manufacturers of the "Butler" filter. (Ref. No. C.A. 183.)

Company News

C. & W. Walker.—It is announced that payment has been postponed of dividends on the ordinary and the preference shares until the accounts for the current year are available.

English & China Clays.—The directors announce that they are unable to recommend any payment of dividend in respect of the preference shares.

Standard Oil Co. of New Jersey.—The directors have declared the regular quarterly dividend of 25 cents per share and the usual extra dividend of 25 cents per share.

Broken Hill Proprietary Co., Ltd.—A net profit for the year to May 31 last of £103,720 is shown in a preliminary statement issued by the company, after providing £252,589 for depreciation and £17,419 for debenture interest.

English Velvet & Cord Dyers' Association, Ltd.—The directors have decided to defer the consideration of an interim dividend on the ordinary shares until the result of trading for the year 1932 has been ascertained. A year ago a dividend at the rate of 4 per cent. per annum, less tax, on the ordinary shares was declared.

W. & H. M. Goulding.—The net profit to June 30 last was £34,896, against £35,250 in the previous year, plus £4,425 brought in. The usual debenture interest and fixed dividend at 5½ per cent. on the preference shares is to be paid and 6 per cent. on the ordinary shares; £6,000 is placed to depreciation account, leaving £3,046 to be carried forward.